



Federal Institute for
Research on Building,
Urban Affairs and
Spatial Development

within the Federal Office for
Building and Regional Planning



Tel Aviv White City: Modernist buildings in Israel and Germany



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Dear readers,

Tel Aviv's White City is a UNESCO World Heritage Site containing around 4,000 Modernist buildings, nearly 2,000 of which are listed. This makes it the world's largest contiguous ensemble of Modernist buildings of exceptional importance for the history of architecture.

Germany's Ministry for Building is helping Tel Aviv to establish a White City visitor and heritage conservation centre. The research conducted by an interdisciplinary research team supported the launch of this project. This research centred around comparing reference buildings in Germany with their Israeli counterparts, as well as investigating and defining the parameters of the construction and building-trades expertise needed for historically accurate heritage conservation and the related good practices in this domain.

The cooperation between professionals in the German-Israeli network of expertise, which will eventually be housed at the White City visitor and heritage conservation centre, will be of benefit to White City buildings and will potentially accomplish the following: provide an impetus for expanded international cooperation between experts; help to further improve training standards in the heritage conservation sector; and promote greater public awareness of the built heritage.

This report is mainly intended for Israeli and German specialists and other stakeholders in the field of heritage conservation. This relationship is an outgrowth of the Eastern and Central European regions from which many of the architects who de-



signed and built the White City's buildings originated. These architects, many of whom were German-speaking Jews, emigrated to Palestine in the 1930s and 1940s. In Palestine, alongside existing Arab settlements and towns, they realized their concepts, which were rooted in European thinking as to what modern residential buildings should be like. Other White City architects, having grown up in Palestine and been involved in the Zionist movement, studied architecture at universities in Berlin, Paris, Ghent, Wroclaw, Rome, London, or Vienna – and later on at the Bauhaus in Dessau as well.

The historical, architectural and formal connections between Tel Aviv's architecture and that of the buildings in many regions of Germany are complex, and in many cases readily apparent. The history of the White City strongly reflects the history of Israel and Europe. And in this, the 50th anniversary of German-Israeli friendship, the research described in this report has made, and will continue to make, a significant contribution to exchanges between experts in the field of heritage conservation.

Director and Professor of the BBSR

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1 Executive summary

The project "Network White City Tel Aviv" is supported by Germany, mainly through establishment of a German-Israeli cooperation network that will allow for the transfer of construction, scientific, and building-trades expertise. The network will focus on the following: rehabilitating heritage buildings and upgrading their energy efficiency in an historically accurate fashion; reviving historic construction methods and promoting the development of documentation methods. The personal contact afforded by this network will enable those concerned to exchange information, ideas and experience concerning heritage conservation in general and pending projects in this domain in particular.

Establishment of the cooperation network was supported by the research project titled "Tel Aviv White City: Preserving Modernist buildings in Israel and Germany," which yielded the results described below.

1.1 Introduction

Certain German loan-words are still used as Hebrew expressions in the Israeli civil engineering industry. These loan words bear testimony to the early days of immigration to Israel, and bind Israel and Germany in a common tradition of architectural training and construction. This has given rise, in both nations, to an express desire to cooperate in rehabilitating the buildings in Tel Aviv's White City, all of which are inhabited.

Hence preserving these buildings in an historically accurate fashion needs to be carefully weighed against the needs of the residents of the White City. Owing to the shortage of housing in Tel Aviv in general, there is considerable economic and social pressure on the White City buildings. This in turn entails a series of measures aimed at optimizing the scarce housing resource constituted by the White City buildings – measures that run counter to the UNESCO tenets of heritage conservation.

Hence in this report we have recommended practical solutions that would be consistent with the reality of residing in the White City, and at the same time would

be consonant with the principles and tenets of the UNESCO world cultural program.

The interdisciplinary nature of the team of researchers behind this report (who comprised restorers, architectural historians and materials scientists) was crucial for the elaboration of the report: The architectural history standpoint allowed for a comprehensive assessment of the special importance of the White City buildings; the conservation and restoration standpoint centred around the reality of conserving these buildings; and a suitably sensitized materials science standpoint sought to implement current research findings in a manner consistent with good-practice heritage conservation.

1.2 Evaluation of the condition of Bauhaus heritage buildings in Germany and Tel Aviv

The various conditions were assessed by focusing on four reference buildings each in Tel Aviv and Germany. The Israeli reference buildings were recommended to us by the Israeli side, while the German buildings were selected with the aim of representing various approaches to heritage conservation. These approaches reflect conservation measures comprising heritage conservation normality in accordance with good to very good standards. The eight buildings in Israel and Germany were vetted in accordance with EN 16096:2012. Comparing the German and White City buildings revealed that virtually all of the White City buildings are slated for complete rehabilitation, in the interest of expanding the scope of currently scarce housing resources. Here, good-practice and historically accurate heritage rehabilitation have a lower priority. But on the other hand, conservation of the German Bauhaus buildings centres around repairs, in that such conservation measures are limited to individual building elements – the goal being to restore them to full functionality and to their original appearance, while at the same time adhering to good practice heritage conservation.

1.3 Heritage conservation in Israel (Tel Aviv) and in Germany

In Germany, the tradition of heritage conservation harks back to the 19th century. Heritage conservation laws in all of Germany's regional states provide comprehensive protection for the nation's archaeological and architectural heritage. The agencies charged with cultural heritage management (known as the Institutionen der Oberen Denkmalpflege) comprise independent entities within the administrative apparatus of each regional state.

In Israel, however, the heritage conservation authorities are directly responsible solely for heritage buildings that were built prior to 1700. A heritage conservation authority (known as the Conservation Team) was not established in Tel Aviv until 1990. This entity is part of Tel Aviv's Department of Urban Planning, which is in turn a sub-department of the city's Planning Department. Hence heritage conservation in Tel Aviv's city government is weaker than in Germany, owing to the absence of an independent administrative entity.

In late 2012, Tel Aviv adopted a program that allows for the addition of up to two and half earthquake-proof floors to virtually every residential building in Tel Aviv. This regulation, in conjunction with the dependent status of the Conservation Team in Tel Aviv's administrative apparatus substantially weakens historically accurate heritage conservation in the White City.

1.4 Energy upgrading in accordance with good practice heritage conservation

Unlike Germany, Tel Aviv is located in a relatively hot, subtropical Mediterranean region. Hence protection against sunlight and the consequent elevated temperatures in residential buildings are a prime consideration. When it comes to the White City, architects deal with this issue as follows:

- By limiting the number of floors in residential buildings, and by defining specific street widths so that ocean breezes can circulate through the White City's streets.

- Through nocturnal cross-ventilation that reduces the heat that builds up during hot days.
- Through the use of shading measures aimed at reducing heat input from sunlight.

Inasmuch as the architecture of White City buildings is suitable for the prevailing climate in Tel Aviv, any changes made in such buildings should aim to restore them to their original state. Such restoration can most certainly be effected in accordance with the tenets of good heritage conservation practice.

The need for indoor cooling (in keeping with today's more exacting comfort requirements) cannot always be achieved with Bauhaus-era construction measures in all cases, cross-ventilation being one example. We recommend that alternatives such as solar cooling and heating be implemented in lieu of the current widespread use of air conditioning. But unfortunately, there is little interest in such solutions owing to the fact that electricity in Israel is relatively cheap. However, irrespective of this factor, experimental demonstration facilities incorporating such alternative solutions should be realized in the White City.

1.5 Heritage conservation issues

Restoring original building colours: Our investigations revealed that not all buildings in the White City are in fact white in colour. For example, the colouration of the external plaster on these buildings was largely determined by the materials used. Only rarely was the colour of these materials varied by adding pigments. Thus in order to restore the original colour of a given object for rehabilitation purposes, it is necessary to investigate the actual plaster on the specific building in question.

Facade plaster: Thanks to the unique constellation of facade plaster types found in the White City today, the abundance of historical plaster available there offers excellent illustrative material for European, German and Israeli experts. The historical mixtures that were used for exterior plasterwork on White City buildings need to be thoroughly investigated, for restoration purposes.

Preliminary comment on structural and architectural elements: The climate in Tel Aviv is conducive to the conservation of historic structural and architectural elements, many of which were European exports to Palestine (British mandated territory). But owing to deficient conservation of Tel Aviv buildings, many of their structural and architectural elements are in poor condition – although many have been preserved nonetheless. This situation underscores the great importance, from an historical standpoint, of a construction archive in Tel Aviv, particularly in light of the situation in Germany, where simple structural and architectural elements have been irretrievably lost.

Wood and steel frame windows: Window conservation is crucial when it comes to preserving the facades of buildings worth protecting, since windows are a central element of a building's appearance. Replacing deficient glazing and sealing existing windows substantially upgrades the insulation performance of buildings to today's standards, without any negative impact on their appearance.

Terrazzo floors: Preserving the many different terrazzo designs and patterns, many of which are magnificently precise, is key when it comes to preserving the authentic architectural and interior elements of heritage buildings. Hence it is particularly important that such terrazzo flooring be preserved.

Upgrading concrete elements: In the interest of developing approaches to building repair that allow for historically accurate heritage conservation, extensive investigations of the relevant buildings should be carried out, and repair measures should be tested using so called pilot building sites. This applies as well to the whole gamut of historic building materials.

1.6 Individual repairs versus top to bottom rehabilitation

In Tel Aviv, top to bottom refurbishment involves not only renovating a building in the usual sense of the term, but also making major changes in its roof and foundation – for example by adding floors. As for restoring and/or repairing individual structural and architectural elements in Tel Aviv, the prevailing view in Israel is that such measures do not go far enough, or are even disfiguring. But in Germany, repairs are regarded as good heritage-conservation practice and are carried out on Bauhaus buildings (see section 1.2).

Germans take a dim view of the Tel Aviv practice (which is allowed by law) of adding floors to heritage buildings. In Germany, such measures are as a rule only approved if floors are added in such a way that an unschooled observer can readily distinguish between the old and new floors. Thus when floors are added to heritage buildings, the intervention should remain readily apparent. This can be achieved through clear delimitation – by leaving a visible gap between the new and old facade, using different materials, using a slightly different colour, and so on.

1.7 The envisaged White City visitor and heritage conservation centre

The envisaged White City visitor and heritage conservation centre should contain the following departments:

The following should be done immediately:

1. The cooperation network described in section 1.8 should be instituted.

The following should be done in the near future:

2. Tourism: Define the historical and geographical parameters, and the specific justifications, for adding a given building to the World Heritage list. Such parameters should be formulated in the manner recommended by the German UNESCO commission.
3. An information centre for White City residents and visitors should be established that would strengthen residents' identification with the White City

The following should be realized in the medium term:

4. A exemplary apartment along the lines of the Bauhaus Dammerstocksiedlung apartment complex should be built in the heart of the White City, or a model home at a peripheral location.
5. A lab that conducts scientific research along the lines of the research being done at the Institut für Steinkonservierung (IfS).
6. A digital archive along the lines of the Monarch database.
7. A document archive, library, photograph collection, and architectural plan collection.
8. A structural element and construction archive dedicated to Bauhaus buildings, along the lines of the Dessauer Bauforschungsarchiv and organized like the Bayerisches Bauarchiv Thierhaupten.
9. A pre-service and in-service training centre.

1.8 The White City cooperation network

The myriad local and international efforts to preserve the White City need to be networked. The elements referred to in section 8 should form the basis for this network.

In the interest of upgrading the energy efficiency of White City objects, we strongly recommend that regular exchanges be conducted between the (putative) White City cooperation network and the (existing) Energieberater für Baudenkmale (Energy consulting for heritage buildings) entity in Germany.

In view of the lack of Israeli training programs for conservator-restorers, we feel that such exchanges are indispensable and should be extensive; for without them it will simply not be possible to sustainably preserve White City heritage buildings in line with international standards. To this end, a centre for pre-service and in-service training should be established.

We also recommend that a platform be established for product and technology exchanges by making Israel the partner nation for the denkmal Leipzig heritage conservation trade show in 2016; this would also create a platform for the White City. Deutsch-Israelische Wirtschaftsvereinigung e.V. (D-I-W) should push for the realization of a small-scale heritage conservation conference on conservation technologies and green conservation for Tel Aviv – also for the purpose of promoting economic exchanges between Israel and Germany in this domain.

2 The White City research project

2.1 Introduction

In applying, in the spring of 2013, for funding for and conducting a White City heritage conservation project titled *Begleitendes Ressortforschungsprojekt zur Weißen Stadt Tel Aviv*, we – a non-Hebrew speaking team comprising an architectural historian, a specialist in building physics and two building restorers – indicated that our main goal was to make contact with Israeli colleagues and to learn about the activities they carry out and the methods they use. Preparation for this project (whose timeline was as short as its topic scope was broad) focused on the following issues and areas: the history of Tel Aviv; dealing with the city's historical heritage; categorizing and identifying heritage buildings; research and documentation on heritage buildings. Other issues and topics that came into play, all of which have been extensively written about in the scholarly literature, were as follows: the biographies of numerous architects in Germany, Israel and elsewhere; the historical circumstances surrounding emigration, flight and persecution.

Prompted by Nitza Metzger-Smuk's "Dwelling on the Dunes" (2004) and "Tel Aviv Neues Bauen 1930-1939" (Institut für Auslandsbeziehungen, 1993), which is mainly about the heritage of Jewish architects and architecture in Mandatory Palestine and Israel, we focused on general heritage conservation issues in Tel Aviv, for which our main source was Haim Jakobi's "Constructing a Sense of Place: Architecture and the Zionist Discourse" (2004).

The White City-Black City issue, which pertains to the Arabic architectural heritage of Tel Aviv-Jaffa, was introduced in Germany in 2011 by Sharon Rotbard, via a publication issued by the Bauhaus Dessau Foundation.

Until very recently, the main focus has increasingly been on Modern Movement buildings, which bear testimony to the establishment of the "first 100 % Hebrew town in the world" (see Figure 1), which was "built on sand," as Tel Aviv was called in the 1930s and 1940s. These formulations express the iconic and now traditional im-

portance of urban development in Tel Aviv. Of crucial importance in this regard is a very frequently published photograph from 1908 showing what Tel Aviv looked like in its early years, and which, owing to the angle from which the picture was taken, bears testimony to the fact that the Jewish settlers were building a new city from scratch – apparently in the middle of the desert.

The most recent writings on this subject attempt to counter this idealized picture of the Tel Aviv settlers, and to show that, far from realizing the utopia described by Theodor Herzl in "Alt-Neuland" (1902), the settlers were in fact merely following the international trend toward architectural functionalism (Harpaz 2013).



Figure 1: Advertising poster of unknown origin titled "Tel Aviv. The First 100% Hebrew Town in the World" (1939-1947)

Heritage conservation issues also arise in connection with the history of the German Templers (Pietist Swabians), who, apart from the "Yekkes" (as German-speaking Jews were called) and native Arabs, resided in Jaffa-Tel Aviv and the environs



Figure 2: The families who founded Achuzad Bayit, which was two kilometres north of the Jaffa city walls, and a few hundred meters away from then-existing settlements on the outskirts of Tel Aviv (Photo: Avraham Soskin, 11 April 1909 [he legend the foto with 1908])

of the (now) heritage buildings until 1939 (when World War II broke out) and 1948 respectively (when the State of Israel was founded). Relevant in this regard are the writings of authors such as Gil Yaron (2010), and in particular recent research by Jakob Eisler (Tel Aviv-Stuttgart¹). According to these sources, the area where Tel Aviv was founded and developed as a city was not unpopulated, nor was its architecture homogenous.

The Tel Aviv Conservation Team is also tasked with preserving this architectural legacy of the then-indigenous population and the German Templers. In the early 20th century, then a suburb of Jaffa, Tel Aviv gradually broke free of Jaffa's administrative apparatus and became a city in its own rights that incorporated this



Figure 3: European immigrants arriving at the port of Jaffa (photo date unknown)



Figure 4: A map of Jaffa, from 1918, which clearly shows the walled old city of Jaffa with its far-flung peripheral settlements/towns on the city's northern outskirts (Mansiyeh, German Colony, Valhalla, Tel Aviv).

much older town Jaffa and numerous other suburbs.

As our research progressed, it became ever clearer that our Israeli colleagues have tremendous heritage conservation expertise and sensitivity, which they deploy with exemplary professionalism and authority, despite being very short-staffed. Hence establishment of a White City cooperation network would also be a boon for Germany, as it would catalyse discussion and debate on heritage conservation here at home.

(1) Jakob Eisler conducted this research at Landeskirchliches Archiv Stuttgart, as well as (in collaboration with Sabine Holtz) at Universität Stuttgart, Historisches Institut, Abteilung Landesgeschichte.



Figure 5: Site of the former bus station serving the route between the White City and Mansiyeh/Tel Aviv (2013).

Apart from the heritage conservation needed for the White City, heritage conservation needs to be strengthened in Tel Aviv in general, irrespective of the beliefs and ethnic origins of the residents and architects in question. This holds true all the more because, from Germany's standpoint, Tel Aviv plays a vanguard role in heritage conservation in Israel. Hence heritage conservation laws need to be amended so as to better protect and raise awareness of today's modernist architectural heritage of Jews, Muslims and other groups.

2.2 Description of the project; BMUB research tasks

Tel Aviv's White City, which was built in the 1930s, is a UNESCO World Heritage Site containing around 4,000 modernist buildings, nearly 2,000 of which are listed. This makes it the world's largest contiguous ensemble of modern buildings of exceptional importance for the history of architecture. The White City also plays an important part in German-Israeli relations as a whole.

Many buildings in Tel Aviv are in dire need of refurbishment or are in a precarious state, and are cared for by local heritage conservation officials. Tel Aviv plans to build a visitor and heritage conservation centre, whose main purpose will be to pro-

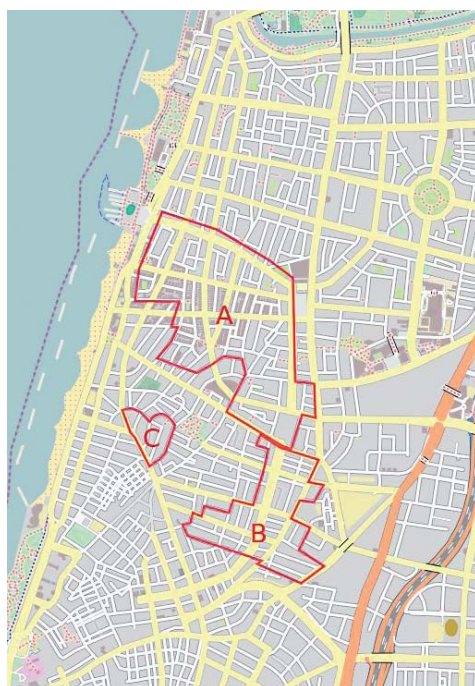


Figure 6: Map showing UNESCO World Heritage Sites (outlined in red) in the White City

mote conservation of the White City. The project will be supported by Germany, mainly through establishment of a German-Israeli cooperation network that will allow for the transfer of construction, scientific, and building-trades expertise. The network will focus on the following: rehabilitating heritage buildings and upgrading their energy efficiency in an historically accurate fashion; reviving historic construction methods and promoting the development of documentation methods. The personal contact afforded by this network will enable those concerned to exchange information, ideas and experience concerning heritage conservation in general and pending projects in this domain in particular.

The aims of the envisaged visitor and heritage conservation centre are as follows: to become a platform for ongoing cooperation; to act as a clearing house for contact between interested parties in Israel and Germany; and to promote technical advances and optimized outcomes in the field of heritage conservation in both Israel and Germany. This in turn will (a) promote discussion and debate about heritage conservation and the development of innovative methods and products in this field; and (b) serve the cause of resource stewardship, green building retrofitting and urban development.

Establishment of such a cooperation network would go hand in hand with the research project whose outcomes and recommendations form the subject of this report. Following is a summary of the measures that need to be carried out:

- A survey and evaluation of the condition of Germany's modernist buildings and in Israel (see the various "d" subsections in section 3.2 and 3.2).
- Reach conclusions concerning heritage-conservation friendly structural and energy efficiency upgrading (see section 5.3.3).
- Make recommendations for the implementation of current and site-compatible sustainable strategies and products in the ecological and sustainability domains (see sections 5.3.1 and 5.3.3).
- Make recommendations concerning the establishment of a presentation plat-

form for German technical equipment and products (see section 8)

- Make recommendations concerning the establishment of a holistically oriented heritage conservation training program (see section 7.8.7).

A brief project description is available on the BBSR website.²

2.3 Nature of the task at hand; investigation approach

The listed buildings in the White City have two salient characteristics. First, they are outstanding and unique examples of Tel Aviv's early architecture and urban development. And secondly, these buildings were designed by Jewish architects from both Western and (particularly) Eastern Europe, who had emigrated to Palestine to escape anti-Semitism, persecution and fascism and who were able to translate their ideas about residential buildings into what became known as the International Style. Numerous other architects were born in Palestine, and did their architecture training in one of Europe's many architecture

schools – the most prestigious being those in Gent, Rome, Wroclaw, London, Paris and the Charlottenburg district of Berlin. Many of these architects, who came from the world of the Deutscher Werkbund, were strongly influenced by architectural developments in Berlin in the late 1920s and by the "Internationale Neue Baukunst" exhibition of 1927 and felt a strong kinship with the Ring and Bauhaus movements, as well as the CIAM.

Their apartment buildings, which were designed for Tel Aviv's urban development department and were based on the urban master plan of Sir Patrick Geddes, constitute a unique and massive ensemble of buildings from the 1930s and 1940s. Even the urban development elements, the manner in which the city was divided into parcels, and the layout of its streets also need to be protected.

For their residents, the villas in the White City are secular objects for daily use that have repeatedly been modernized, expanded or otherwise altered owing to evolving trends and standards for residential buildings and extensive use. Other changes have been made in the original

(2) http://www.bbsr.bund.de/BBSR/DE/FP/ZB/Auftragsforschung/2NachhaltigesBauenBauqualitaet/2013/TelAviv/01_start.html?nn=406060¬First=true&docId=638368#Start (12.02.2014)



Figure 7: Apartment building designed by Mordechai Rosengarten (photo by Itzhak Kalter, Tel Aviv, 1935)



Figure 8: Soskin house by Zeev Rechter (1933), Lilienblum Street 12, Tel Aviv (2013)

buildings for security reasons, often in the entrances from and openings to the street; and these changes have altered the original appearance of these buildings.

Like Berlin's Modernism housing estates (which are also UNESCO World Heritage Sites), these Tel Aviv apartment buildings are inhabited – which means that restoring them to their exact original state is simply unfeasible.

The desire to keep these buildings in their normal state is key to understanding the

approach we took to our research. Peter Münch put it this way in an article in *Süd-deutsche Zeitung* on 25 May 2013: "In Tel Aviv, achieving a pure state of restoration is simply unfeasible;" for (as Münch points out) the economic and social pressure on these buildings is simply too great – as is the amount of work that needs to be done.

Real estate developers purchase individual buildings for the sole purpose of flipping them. To this end, these developers undertake various measures and changes in the buildings, in the interest of meeting the ex-



Figure 9: An apartment building to which floors are being added; Aharonovitch Street, Tel Aviv (2013)

acting standards of tenants or owners; and such measures and changes run completely counter to UNESCO's tenets of heritage conservation. It is noteworthy in this regard that at the "Greening The White City" conference in May 2013 in Tel Aviv, the German minister Renate Künast advocated that rent control be instituted in the White City.

Buildings whose usage continuity is preserved and that are modernized tend to be beloved and preserved by their occupants. Hence continuous, reasonable and "good use" translates into optimal heritage conservation, as opposed to the total lack of respect for heritage buildings displayed by real estate investors, who in the interest of a quick buck, allow buildings to deteriorate, or even go to ruin. Moreover, the residents of these buildings, the populace of Tel Aviv, interested visitors, architects, members of the building trades, and scientists need to be made aware of the uniqueness of the White City's heritage buildings.

2.4 The research team

Having received the go-ahead for the project, in September 2013 the project's research team (whose members are listed below) met in Berlin with their Israeli partners from Tel Aviv, in order to (a) set the stage for the work to come; (b) formulate preliminary research questions; and (c) lay the groundwork for the upcoming research trip to Tel Aviv, in the fall of 2013.

The members of the project's research team were as follows:

Gereon Lindlar Dipl.-Rest. (FH), building restoration expert, Büro für Restaurierungsberatung, Bonn³

Areas of expertise: Restoration-project planning and heritage object monitoring. Tasks for the research project: Project manager; restoration and heritage conservation

Dr.-Ing. Dietlinde Schmitt-Vollmer M.A., Institut für Architekturgeschichte ifag, Universität Stuttgart⁴

Areas of expertise: Teaches architectural history, heritage conservation and construction research



Figure 10: Apartment house with enclosed balconies and an extended top floor; corner of Gordon Street, Tel Aviv (2013)

Tasks for the research project: Deputy project manager; architectural history, heritage conservation, construction research

Kornelius Götz M.A., Büro für Restaurierungsberatung Meitingen⁵

Areas of expertise: Restoration project planning; monitoring industrial heritage objects; head of the DIN committee on standards in the field of cultural-heritage conservation.

Tasks for the research project: Digital room book; article for the BBSR website

Prof. Dr.-Ing. Harald Garrecht, Institut für Werkstoffe im Bauwesen, Universität Stuttgart⁶ Head of the Institut für Werkstoffe im Bauwesen (IWB; Department of Construction materials) at Stuttgart University; scientific director of Materialprüfungsanstalt MPA Stuttgart, Otto-Graf-Institut (FMPIA); member of the German mirror committee of CEN/TC 346 Conservation of Cultural Heritage.

Christian Blatt, M. Sc., Institut für Werkstoffe im Bauwesen, Universität Stuttgart⁷

Areas of expertise: Building-physics projects involving repairs, including the following (among other things): energy balancing; dynamic building simulations; hygrothermic and thermal bridge calculations; heat conduction measurements; teaching courses in his fields of expertise. Tasks for the research project: Building physics

(3) <http://restaurierungsberatung.de/content/personen/gereon-lindlar> (06.03.2014)

(4) <http://www.ifag.uni-stuttgart.de/institut/mitarbeiter/dietlinde-schmitt-vollmer/> (06.03.2014)

(5) <http://restaurierungsberatung.de/content/personen/kornelius-goetz> (06.03.2014)

(6) <http://www.iwb.uni-stuttgart.de/institut/vorstand/garrecht/> (17.12.2014)

(7) <http://www.iwb.uni-stuttgart.de/institut/abtwerkstoffe/personen/blatt/index.html> (06.03.2014)

3 Methodology: building-based research

The various conditions were assessed by focusing on four reference buildings each in Tel Aviv and in Germany.

The data that was compiled in the fall/winter of 2013/2014 was incomplete, as it was not possible to access the interiors of all eight objects. In some cases, the principals in charge were included in the discussions: heritage-building supervisors (in Tel Aviv, Dessau and Karlsruhe); participating architects and restorers (in Karlsruhe); the owner of the building at Am Rupenhorn 25 in Berlin; building users (Tel Aviv, Idelson Street 29; Dessau Konsumgebäude). All of these individuals provided us with information concerning specific problems and outcomes entailed by the conservation of their heritage buildings. It was for this reason that we decided against using a standardized questionnaire.

We were also able to engage in on-site interdisciplinary discussions among ourselves and with our various informants, based on unpublished expert reports (Tel Aviv and Karlsruhe) and public sources (publications, heritage building registers and so on). The limits and options were clear, in terms of identifying sustainable usage modalities under "normal" conditions, as well as outstanding and exemplary rehabilitation methods.

The Israeli reference buildings were recommended to us by our Israeli colleagues. For two of the objects (Idelson Street 14 and 29) we were provided with heritage conservation condition surveys, and for one object an excerpt from such a report (Rothschild Boulevard 117). There was no preliminary documentation available for the Mazeh Street 13 object. We described this object insofar as possible, and also availed ourselves of publicly available background information, most of which is in English. The Idelson Street 29 object was regarded as an example of best practice rehabilitation around 15 years ago. The Rothschild Boulevard 117 object was renovated in 1990 in accordance with the Israeli standards of the time.

All of these buildings are slated for rehabilitation in the near future. We were able

to access other heritage buildings in Tel Aviv during regular inspections by the Conservation Team. For example, we spoke with the owner of two other apartment buildings and his architects. This additional information was indirectly incorporated into this report. We visually investigated representative exterior plasterwork, and in one case measured the plaster colour on site, or removed small samples of the plaster for subsequent lab testing and colour analysis (see section 6.1.1).

The German buildings were selected with a view to enabling us to investigate a range of approaches involving good or very good standards under normal conservation conditions. Rehabilitation approaches and methods have changed over the past two decades in Germany, as they have elsewhere. For example, decades-long neglect of the Weißenhofsiedlung apartment complex in Stuttgart resulted, in the 1980s, in an initial general rehabilitation that is currently the subject of extremely meticulous research. In an exemplary development, beginning in 2002 the Le Corbusier duplex was renovated thanks to financing from the Wüstenrot Foundation. The details and grounds of this object were restored during the project. Likewise encouraging is that the Stuttgarter Tagblatt-Turm, the newspaper's tower which dates back to the 1920s and was at one time across from the Erich Mendelsohn Kaufhaus Schocken department store (torn down in 1960), is now getting 239 newly developed, grey-framed sliding windows that closely resemble the original windows, but still meet today's standards.

In our view, best practice means two things: a successful outcome in a given instance such as the outstanding (and historically accurate) rehabilitation of the Wüstenrot Foundation object, or restoring an object to its original state as is currently being done at Gropius-Haus in Dessau; and small, unspectacular and inconspicuous individual solutions and measures that leave a given object largely intact. This also applies to incremental and judicious rehabilitation measures that enable residents to reside in the object while the project is being carried out. In short, rehabilitation that

Table 1: RCs from EN 16096:2012

| RC | Possible measure |
|------|--|
| RC 0 | No action needed |
| RC 1 | Maintenance; preventive |
| RC 2 | Minor repairs and/or additional investigations |
| RC 3 | Major repairs based on further diagnoses |

is reasonable and sustainable for both the object and its residents.

The eight buildings in Israel and Germany that are discussed in this report were vetted in accordance with EN 16096:2012 ("Conservation of cultural property. Condition survey and report of built cultural heritage"). This is the European standard for status determination and assessment, risk assessments, and recommendation classes (RCs) for heritage buildings and cultural monuments. The RCs comprise an urgency classification based on the measures necessary for each object or installation element, and describe the type of measures that need to be carried out. The RCs classification is seen in Table 1.

3.1 Tel Aviv

In October 2013, we accompanied Tel Aviv Conservation Team architects on a tour of the inner core of the UNESCO World Cultural Heritage protection zones, which enabled us to gain a first impression of the protected buildings in question. Our conversations, on this occasion, with representatives of Tel Aviv's urban planning department and building owners shed light on the situation and led to a better understanding of the so called Geddes plan/report⁸ as an urban development basis for the White City.

In 1925, the visionary Scottish city planner Sir Patrick Geddes (who was also a sociologist and biologist, among other things) was tasked with elaborating a master plan for Tel Aviv known as the General Town Planning Scheme. Geddes had been tapped for this position on the strength of his textbook titled "Cities in Evolution: An Introduction to the Town Planning Movement and the Study of Civics" (1915) and the urban planning he had done in India.⁹ His richly illustrated 62 page report was adopted as a binding plan by Tel Aviv's

chief architect Yacov Shiffman (aka Ben Sira). The Geddes Plan (as the document was titled on the cover of the Geddes report) encompassed the then arable land between the Mediterranean and the plantations of the German settlement of Saron, which is depicted on the map on the aforementioned cover (see Figure 11) as a cruciform settlement to the right, below the middle city stamp. The southern section of the map also shows Jaffa's boundaries and the Arabic and German settlements that were incorporated into Jaffa, which was bounded on the north by the Yarkon river.

The Geddes Plan was implemented without delay, as a 1931 revision of the initial proposal show. This large-scale garden settlement contains abundant green space and numerous large gardens.

The Geddes Plan (which was not officially approved until 1938) provided good air cir-

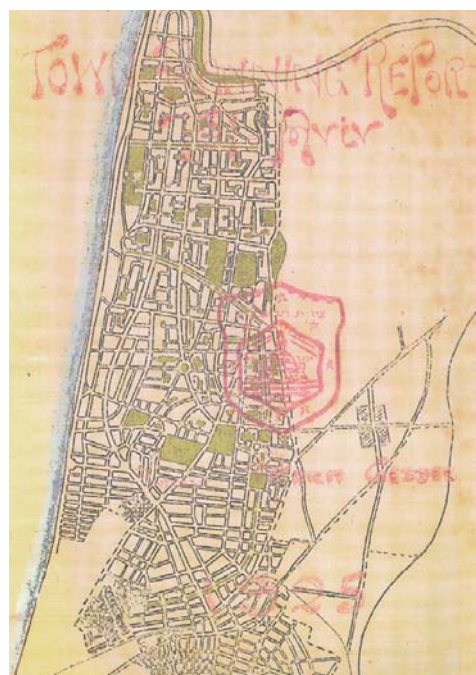


Figure 11: Cover of Sir Patrick Geddes' "Town Planning Report"

(8) Rapoport, Raquel; Schwarz, Horacio: Sir Patrick Geddes's Tel Aviv Plan of 1925. Generating a new form of community. In: *Built for Education: Selection from the Docomomo Registers. Tel Aviv 100 Years.* (= International committee for documentation and conservation of buildings, sites and neighbourhoods of the modern movement, no. 40, March 2009), pp. 58–64

(9) As early as 1910, he published "Surveys for Town Planning, and the greater Cities."



Figure 12: Tel Aviv's main shopping street, Dizengoff Street, Tel Aviv (2013)

culuation from terrestrial and ocean winds by limiting buildings to two or three stories, and by defining specific street widths. Geddes laid out the town's streets in accordance with its topography and vegetation, and took into account existing structures, domains and repositories such as the Florentin and Nordia area (today the Dizengoff Centre¹⁰). He placed particular importance on (a) enabling the city to be aerated by ocean winds; and (b) the use of local construction materials and construction traditions. Geddes termed the superblocs/ home blocks his plan called for "thinking machines," which were precisely tailored to the modern lifestyles of the often bourgeois immigrants to Palestine. The Geddes Plan shows signs of having been influenced by both Joseph Stübbens and Camillo Sitte. The plan's main commercial thoroughfares centralized traffic flows (as they still do today), thus allowing for surprisingly tranquil dwellings in the narrow side streets of the city centre and what Geddes termed "homeways," which were designed as thoroughfares with quiet traffic flows or as pedestrian "lanes."

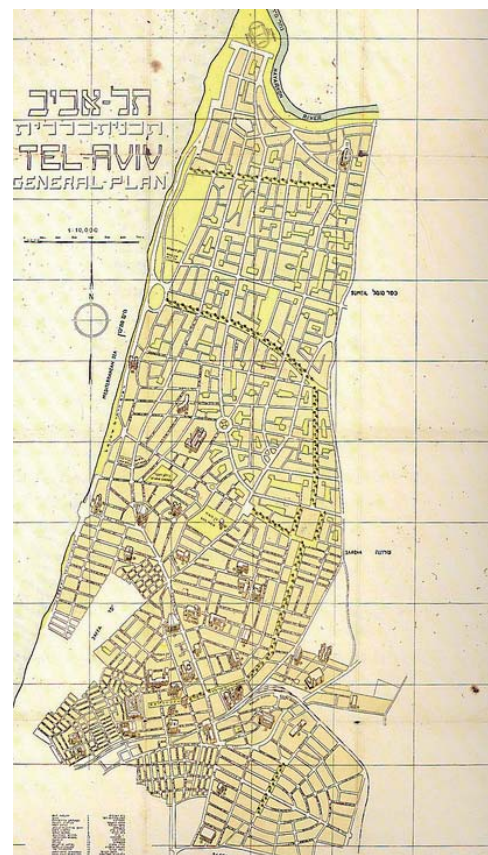


Figure 13: The Tel Aviv master plan (1931)

The centres of these cells comprised usable open space containing trees, flowers and shrubs, or tennis courts and playgrounds. They were originally intended for development based on a system referred to as the windmill schema, via narrow streets and footpaths (rose and vine lanes).

Although the features of Geddes' plan were for the most part implemented, already in the 1930s it became necessary to make certain compromises in and encroachments on the original plan, owing to the ex-

(10) Concerning the Nordia area: Documents of the inhabitants' protest to the redevelopment of the area as a shopping centre, ca. 1971—1977. <http://searchworks.stanford.edu/view/7149636> (25.02.2014)



Figure 14: Landscaped cell behind a former hospital, inner Mazeh Street superblock, Tel Aviv (2013)

tremely high density of Tel Aviv's population.

In particular, the allowable building heights were increased and owners were permitted to build on a greater proportion of their lots. But despite these deviations from the original plan, the urban-planning features and uniqueness of the White City have remained basically intact. The tranquil, spacious, Mediterranean and lushly vegetated city that Geddes had envisioned from the get-go is now part of the UNESCO plan and a focus of urban planning heritage conservation.

Although the objects in the White City exhibit unique designs, many of their architectural and structural features are identical to German buildings of the period. This is attributable to the technical expertise that German immigrants to Palestine brought with them, and the massive amounts of construction materials that were imported from Germany.

The Palestinian architect M.H.A. Pataki described the construction activity in Tel Aviv around 1935 as follows, in a leading scholarly journal:

The new architect arriving in Palestine faces the problem: what are the experience, foundations, materials and construction methods that should be adopted from local building

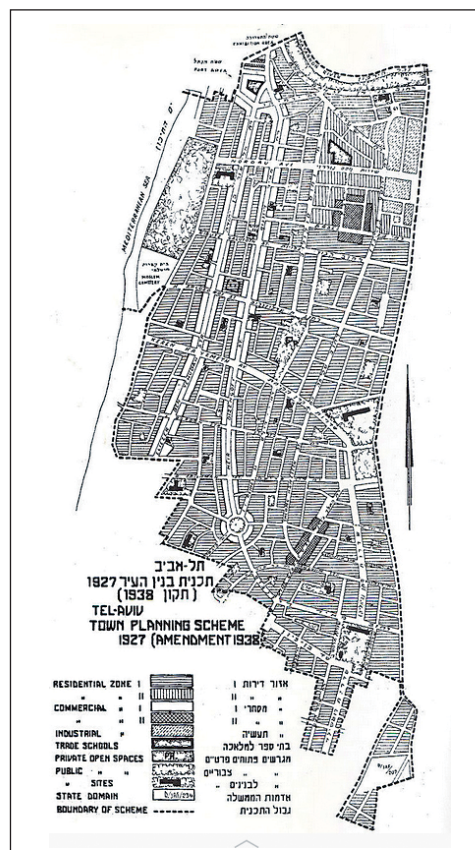


Figure 15: Revised Geddes Plan (Town Planning Scheme) showing the final layout of the superblocks and gardens.

techniques, in order to create a plan for the Jewish urban apartment in the cities. He sees common building materials frequently used... He also sees that the blueprint for an Arab

apartment was not adopted in the Jewish apartment building and did not serve as the starting point for the development of an original plan, utilizing the climatological experience of the Arab builders.

Instead, he relied heavily on European structure, and instead of a home facing inwards on an ever-ventilated central hall, he created a European home entirely facing the street, which forces its residents out of the home onto the balconies.

This method might have been acceptable, it being the continuation of the tradition to which most Jewish immigrants are accustomed, if urban Tel Aviv buildings were built on spacious plots with many garden spaces. Tel Aviv's overuse of the land relative to its climatic conditions and in contrast to accepted plans, with short distances between buildings, resulted in the well-known dispersal of internal family life, which could possibly have been avoided.¹¹

(11) Pataki, M.H.A: Introduction to the Palestine architectural digest "The Object", February 1935. Bauhaus in Jaffa. Modern architecture in an ancient city. – Tel Aviv 2006, pp. 115–118



Figure 16: Richly landscaped front yard (Tel Aviv, 2013)



Figure 18: Typical view of a building from the street (2013). This building's balconies are rarely used as such, as many of them were enclosed after the building was constructed (Tel Aviv, 2013)



Figure 17: Front yard with banana trees and date palms (Tel Aviv, 2013)

3.2 The four reference buildings in Tel Aviv

During our stay in Tel Aviv, city officials enabled us to visit a number of buildings and heritage-building construction sites during working hours, so that we could see at first hand the various standards, possibilities and problems that come into play. It was helpful and informative that we were accompanied on these visits by members of Tel Aviv building inspectors, whose overt presence is intended to prevent illegal construction work from being performed and illegal changes in heritage objects from being made. Through their presence in the streets of Tel Aviv, these highly experienced architects are tasked with preventing owners from doing anything illegal to their her-

itage buildings – although they also assess such situations in a highly pragmatic fashion.

We visited two occupied buildings in the company of their Berlin-based owner, as well as a prominent luxury hotel and other ongoing Conservation Team projects. Thanks to these visits in the company of colleagues and owners, we gained insight into the differences in approach taken by, and the leeway available to, heritage-object owners. These case studies covered a broad range of elements: unauthorized facade painting using blistering emulsion paint; improperly installed glass enclosures for balconies; properly realized owner removal of the glass on enclosed balconies; installation of laminate flooring; air conditioning installation; on-site acceptance of a project involving adding floors to an eclectic-style apartment building, in a “creative heritage conservation” style; and visits to construction sites operated by rehabilitation contractors.

These visits made it very clear that owners want a well tended residential environment with intact facades, and wish to install elevators and upgrade their hot water systems – in short, owners want to improve their heritage buildings. In many such cases, the question arises as to whether elevators should be installed next to the building’s staircases inside the building (which would involve extensive work on the building’s structure), in order to avoid marring the building’s external appearance. Such decisions are made on a case by case basis, via negotiations with the owners and architects.

Selection of the four reference buildings in Tel Aviv proved to be difficult, in that it was not possible to apply the putative selection criteria (significance of the building in question, its condition and accessibility, and the available documentation) uniformly to all buildings. Moreover, during our stay and in the course of the discussions we held with the Israelis and the relevant decision makers the preferences and recommendations concerning the buildings in question changed.

The following buildings were ultimately selected:

- **Idelson Street 14**, Proschneider apartment house; architect: Wilhelm Zeev Haller; built in 1935/1936.

Decision criteria: architecturally important building; German architect (Wilhelm Zeev Haller); documentation about the building was available from Tel Aviv Conservation Team architects (see section 10.1); building located in the Bialik Area (one of the three UNESCO White City core zones); refurbishment ongoing; slated to be a possible joint rehabilitation project for the network; building in poor condition; accessible via the staircases.

- **Idelson Street 29**; architect: Dov Karmi; built in 1935.

Decision criteria: very significant government owned building, designed by one of Israel’s most prominent architects; recommended as a possible site for the White City’s visitor and heritage conservation centre; located in the Bialik Area (one of the three UNESCO White City core zones); building in good condition; second and third floors accessible; roof terrace; best-practice rehabilitation.

- **Mazeh Street 13**; architect: Yakov Shifman (aka Ben Sira); built in 1935.

Decision criteria: extremely interesting large public building built by the city of Tel Aviv; recommended (by us) as a possible site of the White City’s visitor and heritage conservation centre comprising a construction archive and training centre; slated for rehabilitation; designated as a possible joint rehabilitation project for the network (e.g. cooperation between universities); exterior in reasonably good condition.

- **Rothschild Blvd. 117**; architect: Itzhak Rapoport; built in 1935.

Decision criteria: architecturally significant building; documentation available; located in one of the three UNESCO core zones (Rothschild Boulevard); slated for luxury rehabilitation; in poor condition.

3.2.1 *Idelson Street 14, Proschneider apartment house*

Architect: Wilhelm Zeev Haller

Owner: Proschneider

Type of building: apartment complex comprising a front and a rear building; both buildings have a basement; four floors

Year of construction: 1935/1936

Location: The building is located in one of the best neighbourhoods in Tel Aviv's old city, on the same street as the former Tel Aviv city hall, on a former coastal cliff – all of which are indicative of the building's exclusive location.

Changes: Changes were made in the building in the 1940s

a) About the building

Note: Extensive documentation (in Hebrew) is available on the object's inventory, along with numerous surviving historical Conservation Team documents and the annex in the digital room book (see sections 4.6.1 and 10.1).

Four story apartment house comprising connected front and rear buildings (see Tel Aviv Conservation Team documentation, Sept. 2011)¹². The front building is composed of a block-like construction, with upper stories set back; a narrower cube-like construction adjoins the west side of the building. Both sections of the front building are accessed via a single staircase whose vertical ribbon windows (so called thermometer windows)¹³ optically separate the two constructions. Three rounded and cantilevered masonry balconies extend across the entire street side of the building, and

are a prominent visual feature of this ochre yellow plastered building.

From the street, only the front building and the recessed middle section (total width: 11 meters) are architecturally significant. The rounded balconies extend one meter beyond the corners of the building.

b) Major changes in the original object

The building, which was designed by Wilhelm Zeev Haller, was constructed in 1935 and 1936 in two phases, as an interconnected front and rear building.

It was not until the filing of a building permit application in 1941 that a substantial need for security was expressed, by virtue of the application for a permit to massively beef up the entrance lobby of both the front and rear buildings. This resulted in the construction of walls in front of the steps to protect against bullets, and masonry walls in the rear of the building. In this process, the ground floor balcony on the narrow rear of the building was enclosed from the underside, thus creating an additional basement space with a separate entrance. This resulted in the southwest corner of the building becoming rounded. The staircase was outfitted with a protective space.

(12) http://telaviv.restaurierungsberatung.de/system/files/raumbuch-fr%C3%BCehere-inventare-zustand/gutachten_idelsonstreet_14_klein.pdf (14.02.2015)

(13) Tel Aviv's so called thermometer windows are high, narrow staircase windows. This term is little used in Germany.



Figure 19: Proschneider apartment house at Idelson Street 14 in Tel Aviv; northwest view (2013)

The condition of the building's exterior looks pretty much the same as it did back in 1945, at which time an around 2.5 meter high addition was built (after being approved) onto the front building's roof, for use as apartments. Next to the laundry facility on the building's flat roof, smaller rooms and an open pergola were added (plan approval no. 141 of 23 July 1945). According to an old photograph of the building, the balcony balustrades once had a grating on the right-corner opening (laterally bolted-on metal frame with wire-mesh elements).

- c) Original function and (where applicable) other historical functions (use change)

The building was intended for use as an apartment building, and is still being used for this purpose. It is not accessible to the general public.

- d) Condition

The building is inhabited. Owing to inadequate maintenance, the exterior of the building and the building's common areas have incurred slight to serious deterioration. The concrete and metal elements of the fence in front of the building are severely deteriorated and need to be repaired and reintegrated. The original front yard gate has disappeared. The facade elements of the front building, as well as its balcony balustrade and its windows, are deteriorated. Worse still, some of the facade elements and exterior areas at the rear of the building (not visible from Idelson Street) are in a poor condition and have undergone considerable change. However, this does not hold true for the entrance lobbies, which, though quite worn, were recently outfitted with security doors. Many of the building's original features (e.g. from the pre-1948 period) have survived, although some are not fully functional.

Myriad original (and today seldom seen) structural features have survived such as the plasterwork on the outer walls, the built-in storage shelves on the kitchen balconies, the frontal walls for refrigerators, and parts of the staircases. The paths around the building are likewise original, or were added shortly after the building was completed. The rear parts of the building have been altered through the addition

of protective spaces and walls. Air conditioning, downspouts, and mechanical and electrical plumbing were also added after the building was completed.

- e) EN 16096 recommendation class (RC)¹⁴

In our view, the building falls into RC 3 (major repairs based on further diagnoses). For further information on the architects (among other things) and a bibliography, see our digital room book.

3.2.2 *Idelson Street 29 (possible site of the envisaged visitor and heritage conservation centre)*

Architect: Dov Karmi

Owner: Max Liebling

Year of construction: 1935/36

Type of building: three story apartment building with a basement

Location: Idelson Street 29

- a) About the building

This three story apartment building, which was designed by Dov Karmi and is one of the most renowned buildings in the White City, is located in an exclusive and quiet neighbourhood amidst eclectic-style and International Style buildings. Idelson Street is located in the Bialik Area (one of the three UNESCO White City core zones), all of whose buildings are heritage objects.

The building's walls are made of silicate bricks (mineral and cement bricks fabricated on site) and are plastered and limed. The building has a concrete foundation and a concrete flat roof. The building's floors comprise terrazzo slabs that rest on a bed of sand. The building's roof is currently sealed using asphalt elements.

Apartment house containing office space, with a basement, located on a slope. The apartments and office space are spread across three floors in each of two residential units, each of which at one time had two or three rooms; each unit also has a bathroom and two or three balconies. Each room has at least one shaded opening.

The building occupies virtually the entire lot. The roof contains a laundry facility (which at one time had no roof) and a terrace. The main entrance to the building is located on its west side, runs under a pergola and ends at a glassed-in entrance

(14) See table 1 in section 4.6.1.



Figure 20: Idelson Street 29, Tel Aviv; southwest view (2013)

lobby. The ground floor has a side entrance on the east side.

b) Major changes in the original object

The building was completed in 1936. Subsequent conversion and renovation measures are discernible in the building, but owing to a lack of documentation it is unclear when these measures were carried out. All of the building's balconies were temporarily enclosed with windows.

The main changes comprise conversion of erstwhile apartments to office space, which resulted in changes being made involving floors, doors, and non-bearing walls. Technical equipment was also installed. Virtually all surfaces of the building show signs of having been changed. A number of original elements, particularly in the staircase, have survived (flooring, windows, doors, and fixtures). Certain measures were reversed during the 2000 rehabilitation, so as to restore the building to its original state (e.g. the windows were removed from the balconies). The facade plaster was redone, and the pergola and the enclosing wall were renovated.

As at October 2013, no usable ground plans or the like, or any Tel Aviv Conservation Team documentation, were available.

c) Original function and (where applicable) other historical functions (use change)

The entirety of the second floor, which originally contained two units, is now used as an office. This space was probably a doctor's or dentist's office at one time, with a waiting room or reception area.

The presence of numerous extremely small rooms alongside larger rooms of residential quality, as well as bathrooms, indicate that the space was also used by clients or patients.

At the time of our visit, in October 2013, the ground floor contained a daycare centre, while the upper floors were being used as offices and archives.

d) Condition

The building, whose exterior is in good condition, was rehabilitated in the 1990s. On this occasion, the balcony glazing that had been added after the building was

completed was removed, as were the bricks covering the staircase windows and the external air conditioning units, so as to improve the building's appearance and climatic conditions. The cracks in the plasterwork on the facades and balustrades (caused by dampness, among other things) were repaired, the building was re-plastered, and solar reflection was improved. The plastic shading elements were replaced with wooden shutter blinds whose mechanisms are exact replicas of the original ones. Central air conditioning was also installed, but in its current condition is causing moisture damage on the second floor.

A great number of original features of the building have survived: windows; electrical wiring; spyholes, showers; balcony elements; floor and door surfaces.

The redone exterior plasterwork is smoother than the original – which was apparently done to improve the building's solar reflection properties. However, traces of the original plasterwork remain on the rear building, in two spots near a downspout.

All metallic elements are currently painted light blue. The vertical balcony struts were originally yellow in colour, a determination that was made via microsection.

All wooden elements have been stained/scumbled in a warm auburn colour, which is considerably darker than the original surface colour of these elements. The kindergarten entrance lobby and the fence on Idelson Street are now bluish grey. We were unable to determine whether this corresponds to the original colour. The path leading up to the side entrance was clearly realized in a modern architectural idiom and colour scheme. On the other hand, parts of the restored main entrance under the pergola leading to the front building still have the original tiles. The original staircase surfaces have been retained for the most part and are in relatively good condition. Virtually all of the apartment entrances still have the following original elements: block frames and door panels; nickel plated door handle fittings; copper locks; and most notably, moveable spyholes. The entrances to the mezzanine apartments have been modernized.

The entirety of the mezzanine, which originally contained two units, is now used as an office. These "dual apartments" were apparently originally intended for use as private apartments that were open to the public. One room of this erstwhile apartment contains a large (and functioning) free-standing safe, with the original painted decoration still on it. A room that is currently used as a server room for workplace computers was originally a bathroom containing a shower. High quality bathroom fixtures still remain, such as a luxuriantly green terrazzo shower niche that is now used as a shelf niche.

The original wood frame windows have been preserved, along with the original locks and wooden blinds, some with gratings that are in reasonable condition. The building still has its original power line connection, whereas all of the original mechanical and electrical plumbing has been plastered over. The Bakelite switches are still in use. All newer lines are installed on plaster. Damaged blinds have been left as is, and have only been replaced by reversible interior Venetian shutters. Some of the original built-in cabinets in the office space have been preserved. Other smaller rooms, which may have been laundry rooms or the like, are now used as small offices.

The kitchen, which is still in its original location, contains numerous signs of the building's original colours. The flooring appears to have been completely replaced or simply installed on top of the original flooring. However, the balconies still have their original yellow tile floor covering. The original (yellow tile) baseboards in the office space have been preserved.

e) EN 16096 recommendation class (RC)¹⁵

In our view, the building falls into RC 2 (minor repairs and/or further investigations). For further information on the architects (among other things) and a bibliography, see our digital room book.

(15) See table 1 in section 4.6.1.

3.2.3 Mazeh Street 13, Magen David Adom house

Architect: Tel Aviv urban development department; architect in charge Yaa'kov Shif(f)man = Ben Sira; probably designed by Itzhak Reich

Owner: Magen David Adom

Year of construction: 1934. Opened on 26 December 1935

Type of building: Used for a medical emergency response and ambulance service; laterally graded building sections; three floors

Location: Mazeh Street 13 (aka Maze or Maza Street)

We were unable to access the interior of the building on the occasion of our visit in October 2013.

a) About the building

The Tel Aviv Conservation Team has no inventory of the elements of this building; nor does it have any of the original plans or other documents for the building. There is a photograph from 1934 (Nitza Metzger-Szmuk, 2004) that is annexed to the digital room book for our research project (see section 4.6.1).

The building, which was originally designed for use as an emergency hospital, comprises three interlocking structures built one in front of the other (see Figure 21). The building meets the contemporaneous requirements for an emergency hospital, by virtue of the following elements: an ambulance entrance in front; a wide double-door entrance for rapid delivery of patients; bed elevators; operating rooms; and open loggias in the eastern section of the building, as with today's rest-cure hospitals. The object is a total of about 35 meters wide, and around 13.5 meters at the core structure on Mazeh Street, and at the stairwell around 15.8 meters high. We estimate that the building occupies around 600 square meters of its lot.

b) Major changes in the original object

Parts of the "thermometer" windows have been modified, and a security wall was added to close off the formerly large opening in the facade. It is unclear whether the low addition on the west side of the building is part of the original building. The original window shutters and blinds on the Mazeh Street side (and perhaps elsewhere) have been replaced.

No information is available concerning the construction phases of the object.



Figure 21: Mazeh Street 13, Tel Aviv (Magen David Adom house); southeast view (2013)

- c) Original function and (where applicable) other historical functions (use change)

The building was originally designed for use as the Magen David Adom emergency hospital.

- d) Condition

The building is in poor, but still usable condition. From the outside, only a handful of major defects are visible; some of the window shades are broken. In the spot where a sign was removed next to the front entrance, older plasterwork and the attendant plaster colour are visible. Half of the entrance lobby is glassed in, and older glass panes in the entrance were recently covered over with coloured film. The lower staircase window has been partly bricked over. The facade openings on the sun terrace on the eastern part of the building were closed off by a safety wall.

- e) EN 16096 recommendation class (RC)¹⁶
Not classified.

For further information on the architects (among other things) and a bibliography, see our digital room book.

3.2.4 Rothschild Boulevard 117, Aharonovitch building

Architect: Izthak Rapoport

Owner: Ben Zion Aharonovitch

Year of construction: 1933/1934

Type of building: Three story apartment building with a basement; composed of staggered cubic constructions.

Location: Rothschild Boulevard 117 (corner of Bar Ilan Street)

- a) About the building

A small amount of Hebrew as built-documentation is available, along with numerous surviving historical Tel Aviv Conservation Team documents and the annex to the digital room book (see sections 4.6.1 and 10.1).

The Aharonovitch building is located in the centre of one of the three UNESCO White City core zones (Rothschild Boulevard), which is also one of the main open spaces in the Geddes Plan.

Owing to three constructions arranged one behind the other and separated by glass elements, the building's around 900 square meter corner lot on Rothschild Boulevard appears from a distance to be positioned diagonally on the lot. From the corners of

(16) See table 1 in section 4.6.1.



Figure 22: Rothschild Boulevard 117, Tel Aviv; southeast view (2013)

the cubes rise two relatively high stairwells with rounded edges, from which the upper floors are accessible. This highly sculptural design facing the main street is extended via a designed exterior area. The rear section of the structure was built around a courtyard, for purely practical reasons. The height of the structure varies from 15 to 19 meters.

b) Major changes in the original object

A permit for construction of the building was issued in 1933.

A building permit for the Itzhak Rapoport apartment building, for Ben Zion Aharonovitch, was issued on 10 August 1933 after various blueprints were submitted. The current layout of the building is the same as the original layout.

The building permit pertained to construction of an office and two storage rooms on the ground floor, and three three-room apartments and one four-room apartment on the second and third floors. The building's roof was designed to accommodate two laundry rooms.

During a 1990 renovation, unsuitable material was used to plaster and paint the building; today, the paint is flaking off and the plaster is falling off.

All of the street side windows and window shades (which are now plastic) appear to have been replaced.

The condition of the back yard has been modified through the addition of external structures.

The original staircase windows have been preserved, but have been welded shut, making them unusable for ventilation purposes.

c) Original function and (where applicable) other historical functions (use change)

Original representative apartment building located right on the street.

The rear of the building, which is accessed via a back yard, shows signs of extensive use, which can be seen on the exterior

metal steps and walkways that were added to the building later.

d) Condition

The exterior paint is flaking off and plaster is falling off the underside of the balconies; large cracks have also developed. The additions to the side of the building are in poor condition, but still have their original surfaces and to some extent their original Arabic window shutters. The condition of the back yard, which is poor, is also now very difficult to discern due to the addition of new external structures.

e) EN 16096 recommendation class (RC)¹⁷

In our view, the building falls into RC 3 (major repairs based on further diagnoses). For further information on the architects (among other things) and a bibliography, see our digital room book.

3.3 The four reference buildings in Germany

3.3.1 *Karlsruhe Siedlung Dammerstock, Danziger Straße 12–14*

Architect: Walter Gropius

Owner: Baugenossenschaft Hardtwaldsiedlung Karlsruhe

Year of construction: Planning and construction: 1927—1929

Type of building: Five story apartment complex with a basement

Location: Weiherfeld-Dammerstock district in the southern part of Karlsruhe, Danziger Str. 12–14 (formerly Albert-Braun-Str. 12–14)

Statutory heritage conservation status: Cultural heritage within the meaning of Article 2 of the Denkmalschutzgesetz (DSchG, Heritage Conservation Act), i.e. conservation of the object is in the public interest for research, artistic, or national-history related reasons. Hence, under Article 8 of the Denkmalschutzgesetz, construction can only be carried out for such a building with permission from the heritage conservation authorities.

Overall context: Part of the Muster-/Ausstellungssiedlung Dammerstock model exhibition apartment complex (1927—1929)

(17) See table 1 in section 4.6.1.



Figure 23: Dammerstocksiedlung, Danziger Strasse 12–14, Karlsruhe; eastern view (2014)

Architects in charge of the project: Walter Gropius and Otto Haesler

Architect: Walter Gropius

General contractor: Baugenossenschaft Hardtwaldsiedlung Karlsruhe

a) About the building

The object is composed of two five story apartment houses that are fully plastered and that each contain eight three or four room apartments. The buildings face directly north and south. The penthouse apartments are set back from the front of the building and are fronted by roof terraces. The lower floors are staggered in such a way as to allow space for bicycles, apparatuses and the like on the yard side of the building.

A salient feature of the building is the tower-like quality of the staircases, a result of the staggered-floor arrangement, which endows the apartments with both eastern and western accessibility. The east side of the building facing the street has angular balconies with corrugated steel balustrades. These balconies wrap around the north side of the building.

The north side of the building is fully enclosed, and the construction at no. 14a adjoins the building's south side.

Construction features and materials (historical terms according to the information in the building plans, which were elaborated by Walter Gropius in 1929):

- Load bearing walls: brick walls, perpendicular to the exterior wall
- Non-load bearing walls: Exterior Backsteinhohlmauerwerk masonry (32 cm Füllmauerwerk masonry); interior plaster and Gipsdielenwände walls
- Floor slabs on the ground floor: reinforced concrete Plandecke slabs.
- Ceilings on the upper floors: Koenen'sche Eisenbetondecke (Stegdecke) (a type of reinforced concrete) spanning the two wall slabs; underside: plaster applied to Doppelrohrmatten elements.
- Roofing: Koenen'sche Eisenbetondecke (a type of reinforced concrete); Bimsüberbeton cement; Korkdämmplatten (cork insulation tiles); Zementglattestrich (cement coating); Pappolein

roof covering; Gartenmann-Belag flooring on the terrace; artificial-stone steps.

- Linoleum floor covering installed on xylolite screed.

b) Major changes in the original object

The buildings are part of the Muster-/Ausstellungssiedlung Dammerstock (1927—1929; Walter Gropius and Otto Haesler, supervising architects). The general contractor was Baugenossenschaft Hardtwaldsiedlung Karlsruhe.

Planning and construction: 1927—1929. Contrary to the plans published by Walter Gropius in 1927, the balconies wrap around the north side of the building.

Virtually all of the original features in the stairwell at Danziger Street 12 have been preserved: the original mailboxes, wooden railings, terrazzo flooring, yellow artificial-stone steps, and apartment entrance doors with steel door frames.

Unfortunately, blue PVC flooring was used in the staircase and black edge elements have been added to the stairs for safety. This colouration is the same as the partly visible paint job on (a) the iron elements of the staircase railings; and (b) the inside of the entrance door. This coating has been painted over in reddish brown, which is also the colour of the exterior of the building's entrance door. The wooden railings are painted in black. The walls have been plastered over in sand-yellow plaster. New electrical lines have been installed in raceways installed on plaster in the ceiling.

Apartment 14 was refurbished in the winter of 2013/2014.

- c) Original function and (where applicable) other historical functions (use change)

The building is used as an apartment house.

d) Condition

The surface of the envelope of this apartment house is in good condition, although the façade facing the street was painted using Perbolgum paint (a brand name of the time). The staircases are in need of renovation.

Apart from the metal frame basement windows and a wood frame sliding window in the staircase at no. 12, all of the original windows have been replaced. The grey-painted frames of these new windows are relatively wide, and are inconsistent with the original design of the building – although they also echo the original configuration and colouration.

The corrugated-steel balcony balustrades, which now form an angular enclosure for the balconies, stem from the 1950s. The original balustrade material is found only on the top floor.

Owing to the thermal bridge exhibited by the building, the façade on the top floor is permanently covered with algae.

e) EN 16096 recommendation class (RC)¹⁸

In our view, the building falls into RC 2 (minor repairs and/or further investigations). For further information on the architects (among other things) and a bibliography, see our digital room book.

3.3.2 Dessau-Törten, Konsumgebäude

Architect: Walter Gropius

Owner: Konsumverein Dessau und Umgebung

Year of construction: 1928

Type of building: Small five story apartment building with single-level retail spaces and a basement.

Location: Zentrum der Versuchssiedlung, Am Dreieck 1, Dessau Törten

a) About the building

The building is used as a logistics centre for the Bauhaus-Siedlung Dessau-Törten apartment complex, and is located, as a visual orientation point, in the centre of the complex.

Type of construction: Small apartment and commercial complex in the form of an enclosed construction and a five-story apartment building.

b) Major changes in the original object

The facade was repainted in 1976 to mark the 50th anniversary of the inauguration of the Bauhaus art school building. The

(18) See table 1 in section 4.6.1.



Figure 24: Konsumverein building, Dessau-Törten; northwest view (2014)

Konsumgebäude building was sold to a private owner in the 1990s and was rehabilitated in 1995—1996.

c) Original function and (where applicable) other historical functions (use change)

The low rise building was designed for use as retail space, and was originally divided by curtain walls into the following three areas: a cafe (later dry goods); a grocery store; and a butcher shop.

The residential building was originally used as follows: common rooms and the butcher's refrigerated rooms on the ground floor; above this, three 100 square meter three-room apartments, each of which had a kitchen and bathroom, and a storage room that was accessed from the staircase; and on the roof, a community laundry room, a storage/drying room, and a terrace.

d) Condition

The object, which incurred no damage whatsoever from Allied bombing in World War II, is in good condition, because the owners are interested in restoring the building and because it accommodates the Informationszentrum der Bauhaus-Stiftung Dessau für die Siedlung Törten information

centre. The apartments are all inhabited. The facade renovation and roof conversion were effected in the 1990s and have an impact on its appearance.

The owners are interested in rehabilitating the building and upgrading its energy efficiency in an historically accurate fashion.

e) EN 16096 recommendation class (RC)¹⁹

In our view, the building falls into RC 2 (minor repairs and/or further investigations). For further information on the architects (among other things) and a bibliography, see our digital room book.

3.3.3 Berlin Siemensstadt, "Panzerkreuzer"

Architect: Hans Scharoun

General contractor: gemeinnützige Baugesellschaft mbH Berlin Heerstraße

Owner: Since 1936/1937: Wohnungsbaugesellschaft GSW (Die Deutsche Wohnen)

Year of construction: 1929/1930; first inhabited on 1 April 1930 (first construction phase involving the Ringsiedlung apartment complex)

Location: Jungfernhaideweg 1–15, in Berlin's Charlottenburg-Wilmersdorf dis-

(19) See table 1 in section 4.6.1.

trict, and in Spandau, which is a neighbourhood in Siemensstadt

Type of building: Apartment complex built as a ribbon development

Context:

- Ringsiedlung, i.e. Siemensstadt apartment complex comprising the following: 1,370 apartments, 90 percent of which are up to 2 room apartments; 11 stores; a central laundry room; five offices; a central heating system; and a school.
- Urban planning design by Hans Scharoun; project supervised by Martin Wagner.
- Participating architects: Walter Gropius, Otto Bartning, Hugo Häring, Fred Forbat, Paul Rudolf Henning and Hans Scharoun. Open space designed by Leberecht Migge; technical building systems designed by Max Megering-shausen.
- Scharoun's architectonic section: curved apartment building on Mäckeritzstraße; two apartment buildings on Jungfernheideweg (Göbelstraße – Mäckeritzstraße section); Geißlerpfad apartment building (1956) on Goebelstr. 1–9 (apartment house accessed via a balcony).
- The Panzerkreuzer apartment building is one of three such objects designed

by Hans Scharoun, which in the professional literature are referred to as the Bauteil Scharoun (Scharoun section).

Statutory heritage conservation status:

As part of the Bauteil Scharoun, a heritage building since 21 November 1958 (Annex to Article 24(2) of the Bauordnung für Berlin (Berlin Building Code); and listed since the Denkmalschutzgesetz Berlin (Berlin Heritage Protection Act) came into effect. In addition, as part of the Ringsiedlung Siemensstadt apartment complex, as of 13 February 1971, a heritage building of the Landesdenkmalamt der Stadt Berlin (LDA; Berlin Heritage Authority); and as of 1995 listed as a so called Gesamtanlage (residential building with open space), Objekt-Dok.-Nr. 09040492.

UNESCO World Heritage Site since 7 July 2008, by virtue of its being a "Berlin Modernism Housing Estates" building, along with Hufeisensiedlung, Weiße Stadt, Carl Legien, Schillerpark and Gartenstadt Falkenberg.

a) About the building

The structure is an around 140 meter long, four and five story apartment complex, with unusually pronounced ship-design elements, including a sun deck. The layouts



Figure 25: Großsiedlung Siemensstadt "Panzerkreuzer," Berlin-Charlottenburg, southeast view (2014)

are based on the Berliner Sonderprogramm für Kleinstwohnungsbau from 1928 (an urban development project for very small apartments). Each end of the building has a small ground floor retail space. The first section of the building to be completed (in 1929) was part of the "gateway" to the Siemensstadt complex. This apartment complex embodies the pioneering design features of a spacious city containing landscaped open space.

This Scharoun apartment complex in Berlin was soon nicknamed the Panzerkreuzer, or battleship. The east facade is the most arresting feature of the building, by virtue of its deeply rounded recesses at the roof terraces, and the unusually deeply recessed rounded balcony skirting (to protect against the sun and inclement weather), which faces north.

Because the apartment layouts are mirrored counterparts and diagonally wrapped around the staircases, the main rooms in these dwellings alternately face east and west. The building is conventional in that it is constructed of brick and reinforced concrete cladding. The terrazzo tile and linoleum floor surfaces require little maintenance. The building's permanent fixtures are factory-made, thus contributing to a typical appearance.

The southern head-end building was rebuilt in a simplified form after having been damaged by Allied bombing during World War II.

b) Major changes in the original object

Großsiedlung Siemensstadt (aka Ringsiedlung) is an apartment complex located in Berlin's Charlottenburg-Nord district. The object was constructed between 1929 and 1931 as an eastern extension of Siemensstadt, which was located in the Spandau district. The project was supervised by city council member Martin Wagner, and the architect Hans Scharoun oversaw elaboration of the urban development concept. The Panzerkreuzer, along with other apartment buildings, is referred to as the Bauteil Scharoun (Scharoun section), after its design in Siemensstadt.

The building was partly damaged by Allied bombing in 1943.

After the war (1949—1950), the southern head-end building above the retail space was rebuilt in a reduced and architecturally conservative form.

Since 1982, an energy efficiency upgrade program has been in progress, supported by heritage conservation expert reports, as a basis for all future rehabilitation measures. In 1986, the severely damaged rounded balcony balustrades were completely redone. From 2009—2011, the windows in the Siemensstadt apartment building were either repaired or replaced, and the following additional measures were taken: the basement ceiling was insulated; the roofs were sealed; an expert report on historic-garden conservation was elaborated, and the open space was landscaped. In 2013 and 2014, the walls and wooden elements of the staircases were repainted and/or refurbished.

c) Original function and (where applicable) other historical functions (use change)

Apartment building for workers and low income families. The apartments were occupied by Gemeinnützige Baugesellschaft mbH Berlin Heerstraße tenants, and since 1936/1937 by GSW tenants.

The retail space in the southern head-end building was originally used by Berliner Bank, and is today a store. The commercial space in the middle section of the building is now a small restaurant. The store at the north end of the building (which contains bakery equipment) is currently vacant, owing to long overdue rehabilitation.

d) Condition

Having incurred severe damage due to Allied bombings in 1943 (the end section of the building was completely destroyed), the building was only partly restored to its original appearance. The end section of the building was rebuilt in a reduced form (changes were made in the balconies, windows and roof).

Hence the building is not only an outstanding example of modernist architecture, and of the social-reform oriented apartment buildings of the Weimar Republic, but also documents the changes and reassembly that was effected during the post-war pe-

riod. The fact that the object has been inhabited without interruption, and that it has been rehabilitated in small stages has decisively contributed to conservation of the object and its heritage nature. The building is inhabited, and is maintained by GSW owners in accordance with good practice heritage conservation.

e) EN 16096 recommendation class (RC)²⁰

In our view, the building falls into RC 2 (minor repairs and/or further investigations). For further information on the architects (among other things) and a bibliography, see our digital room book.

3.3.4 Berlin, Am Rupenhorn 25

Architects: The Hans and Wassili Luckhardt; Alfons Anker

Owner: Richard Kluge

Construction company: Philipp Holzmann AG

Year of construction: 1929—1930;
conversion: 1934

Landscaping: around 1930/1932,
by Berthold Körting

Location: Am Rupenhorn 25; address
today: Heerstraße 161, 14055 Berlin

Original construction and materials

Steel framework (Holzmann Müller system) fitted with pumice stone slabs. Window frames, flat roof and base elements constructed of coloured enamel. In the interest of preventing cracks, the exterior and interior envelopes were mounted in front of the steel framework. Exterior envelope: smooth plaster applied to wire mesh and wood-wool building boards. As the building was originally painted using white oil paint and encaustics (site finding), its colour has not been altered by weathering. Originally, white linoleum cladding was supposed to be installed, but this was never done.

Heritage status: As of 20 August 1979, listed as a Baudenkmal Wohnhaus und Einfriedung heritage building in the Berlin heritage list for Charlottenburg-Wilmersdorf (no. 09096082).

(20) See table 1 in section 4.6.1.



Figure 26: Oblique (southwest) view of the building at Am Rupenhorn 25 in Berlin (photo: Christian Gahl).

Public presentation: The building is listed by the Senatsverwaltung für Stadtentwicklung und Umwelt Berlin under the Erkennen und Erhalten rubric (and under the Denkmalpflege vor Ort rubric) under the Wohnhäuser category, along with the Am Rupenhorn 24 object under the name Haus Luckhardt.²¹ The building's private owners make it available to the public at set times and by appointment.

a) About the building

This elegantly designed home was constructed using the most modern materials available at the time, and has a largely support-free ground floor layout: open library and living room, four bedrooms and three baths on the upper level, and a kitchen in the basement. Extremely cantilevered and rounded terrace above slope, with a small glass roof. The facade of the living room/library area is completely glassed in. The interior features exquisitely painted walls, in conjunction with linoleum, parquet and carpeted floors.

Steel framework (Holzmann Müller system) fitted with pumice stone slabs.

Window frames, roof and base elements constructed of coloured enamel. Outer and inner envelopes originally freestanding in front of the packing elements, thus forming an air layer, so as to avoid cracking.

Facade constructed of plaster applied to wire mesh and wood-wool building boards (air space between the structural elements and outer envelope, for insulation purposes).

This house is one of the most important examples of modernist architecture in Germany, as is the house next door at Am Rupenhorn 24.

b) Major changes in the original object

- Built in 1929—1930, grounds landscaped around 1930/1932; both designed by Berthold Körtning.
- Converted to a four-room home in 1934.
- At an (indeterminable) later date, the outer envelope of the facade was removed and was replaced by panels.
- In the 1970s, the facade was coated with polyester mesh and dispersion paint.

Between 1997 and 2011, the owner realized extensive rehabilitation, in order to compensate for the object's structural weaknesses and restore it to its original appearance (substance-preserving facade rehabilitation in 1999, following deterioration mapping and restoration related paint investigations; anti-corrosion measures for the accessible metallic elements; crack rehabilitation by gluing-on polyester fleece and painting using silicone resin paint; ground-plan restored in 2004; interior decor/design and appointments/fixtures completed in 2011).

c) Original function and (where applicable) other historical functions (use change)

Single-family dwelling, since converted to a duplex.

d) Condition

Following numerous conversions in various stages, in collaboration with the Landesdenkmalamt Berlin and Deutsche Stiftung Denkmalschutz, the object was repaired and properly rehabilitated by the owner's architect. This project, which was completed in October 2011, resulted in the object largely being restored to an historically accurate state. These extensive measures reflect the strong commitment on the part of the owner (who is knowledgeable about heritage restoration) to restore the building in accordance with good restoration practice.

The only elements that are modern and thus not in keeping with the primary building design (and which were deliberately retained) are the surfaces of a second story window, which is not visible from the street, and of one bathroom. The building is in exemplary condition and is being very well maintained. The grounds and the walls surrounding it are likewise in good condition.

e) EN 16096 recommendation class (RC)²²

In our view, the building falls into RC 1 (repairs/preventing conservation).

For further information on the architects (among other things) and a bibliography, see our digital room book.

(21) http://www.stadtentwicklung.berlin.de/denkmal/denkmalpflege_vor_ort/de/luckhardt/index.shtml (10.02.2014.)

(22) See table 1 in section 4.6.1.

4 Heritage conservation in Israel (Tel Aviv) and in Germany

4.1 A brief history of heritage conservation in Germany and Europe²³

Writings about heritage conservation already existed in the Renaissance and even in ancient Rome.²⁴

Heritage conservation in Germany, whose development has gone hand in hand with a growing sense of national identity, has been widely researched and explicated (e.g. Georg Mörsch 2005, Norbert Huse 1984 and Achim Hubel 2006). A brief account can also be found in a book by Michael Petzet and Gert Mader,²⁵ who note that since the 19th century, the nations located in what is today Germany have had laws banning the demolition of city walls, castles, and forts, including ruins, and even regulations protecting privately owned heritage objects. One of the earliest champions of heritage conservation in Germany was Karl Friedrich Schinkel, who advocated that objects be preserved in their original state – an approach radically different from the heritage conservation practice in later decades of modernizing and “improving” everything.

This “modernizing” approach was championed and practiced in particular by Eugène Emmanuel Viollet-le-Duc, who used then ultra modern construction techniques to restore French cathedrals, as well as monastery and convent churches. His restoration of Pierrefonds Castle and the city walls of Carcassonne involved massive and transformative changes in and “improvement” of the original objects. This “creative” approach to heritage conservation was also adopted for post-war re-assembly of Cologne’s Romanesque churches and can still be seen today.

In contrast and at around the same period, in his books “The Stones of Venice” and “The Seven Lamps of Architecture,” John Ruskin came out in favour of relatively objective documentation of large Medieval objects, and preserving them in their original state.

These polarized positions and the often-times embittered methodological dispute between the two camps marked the evolution of the approach to heritage conservation in Germany. One camp advocated restoration of a given object to a state that was considered to be its “original” state, while the other camp was in favour of preserving the cultural legacy by preserving the traces of the past.²⁶ This polarization was particularly in evidence during the dispute over the Heidelberger Schloss (Heidelberg Castle) around 1990, which featured slogans (and bones of contention) such as the following: “conservation not restoration;” “allow beauty to die a peaceful death;” or “reconstructive restoration”. These issues were debated again some years ago, when Heidelberg Castle was nominated for the UNESCO World Heritage Site list. Here, the debate revolved around which measures should be taken for the castle ruins.

As Knaut notes, Gottfried Kiesow, the late Landeskonservator (chief heritage conservation official) of the regional state of Hesse, described the post-war discourse on heritage conservation and the manner in which the European Heritage Conservation Year (1975) unfolded, as follows:

“As early as 1900, people were advocating that the scope of heritage conservation be extended from individual objects to ensembles as a whole. The urgency of conservation during the postwar period (1945-1970) solely allowed for efforts (which were mainly unsuccessful) to preserve individual objects. The post 1970 period saw a breakthrough in the approach to heritage conservation, a trend reflected by new expressions such as “urban heritage conservation object.” Rigid value assessment categories, which had always been shunned in Germany and had by and large been implemented by decision-making bodies, were abolished. As Historicism had become a recognized relevant historical period, the time frame was now expanded from 1870 to 1945, and the concept of heritage conservation was now extended to include urban objects, social history, industrial history and technical criteria.”²⁷

(23) See Knaut, Matthias: *Museologie und Denkmalpflege, Kurseinheit 4 Denkmalpflege*. In: *Weiterbildendes Studium Restaurierung WeisRest*. – Hagen 2001

(24) Hubel, Achim: *Denkmalpflege. Geschichte. Themen. Aufgaben. Eine Einführung*. – Stuttgart 2006, pp. 14–20

(25) Petzet, Michael and Mader, Gert: *Praktische Denkmalpflege*. – Stuttgart 1993, pp. 13–23.

(26) Remembrance value: age value and historical value; present value: use value and artwork (newness value and relative artwork), based on Riegl, Alois: *Der moderne Denkmalkultus, sein Wesen und seine Entstehung*. – Leipzig 1903 (<https://archive.org/stream/moderne-denkmalk00denkgoog/page/n4/mode/2upals>) (28.04.2014)

(27) Knaut, Matthias: *Museologie und Denkmalpflege, Kurseinheit 4 Denkmalpflege*, in: *Weiterbildendes Studium Restaurierung (WeisRest)*, Hagen 2001, p. 32. See there the reference to: Kiesow, Gottfried: *Denkmalpflege in Deutschland*, Stuttgart 2000. The relevant texts can be found in: *Deutsches Nationalkomitees für Denkmalschutz (Hrsg.): Denkmalschutz. Texte zum Denkmalschutz und zur Denkmalpflege*, Bd. 52, Bonn 1993

This paradigm shift toward the modern approach to heritage conservation, via the Charter of Athens (1931) and its successor, the Charter of Venice (1964), cannot be discussed in detail here, as is also the case with the evolution of the relevant legal frameworks. Suffice it to say, however, that heritage conservation in Germany has been marked by long and intensively cultivated experience with elaborating conservation criteria and regulations. Heritage conservation discourse currently revolves around the protection status of postwar objects in West Germany and East Germany in the run-up to reunification in 1990.

4.2 Heritage conservation laws in Germany

Inasmuch as, under Germany's federal system, the individual regional states are in charge of heritage and cultural conservation, each regional state has adopted its own specific heritage conservation laws. These laws, the *Denkmalschutzgesetze*, in many ways have similar or comparable structures. This is attributable to the fact that they all strive to achieve essentially the same goals such as identifying objects in need of conservation. That said, the various regional-state laws do in fact greatly differ from each other in various ways. The Deutsches Nationalkomitee für Denkmalschutz (DNK; German National Commission for Heritage Conservation) has published a compendium of all current conservation laws, so as to allow those concerned to get a general impression of this body of laws.²⁸

All heritage conservation laws lay down criteria for determining what is (and is not) a heritage object. Differences already emerge, at this level, in the wording of the various laws, which define the division of labour for heritage conservation, and in particular specify the tasks assigned to each of the various government agencies. The laws also (a) assign responsibility for heritage conservation to entities such as churches and archives (e.g. in Bavaria); and (b) elucidate the relevant approval and permit issues. These laws also govern matters such as access rights, and the reporting and notification obligations to which the owners (and discoverers) of movable heritage objects are subject. The laws set forth/define the following statutory obliga-

tions: funding of the various regional states and bodies to the conservation of public and private domain heritage objects; the maximum fines for violating conservation laws.

The heritage conservation laws also contain lesser known regulations concerning certain aspects of archaeological site conservation. They entail provisions that govern newly discovered cultural assets. Most of Germany's regional states define heritage conservation as a task that promotes the "general good" and is thus regulated by the government.

A decade ago, Dieter Martin and Michael Krautzberger described the current heritage conservation situation in Germany as follows:

*"The debate over the differences in value and class of heritage objects, as most recently expressed in East German laws, is simply passé. In all of Germany's regional states today, heritage conservation is a legal term that is fully subject to judicial oversight. Determinations as to what is and is not a heritage object are made based on scientific and technical criteria. There is simply no place here for mere 'democratic' majority decisions, as was recently shown by the unfortunate experience with municipal jurisdiction over determinations as to what qualifies as a protected object (...). The decisive difference between the 16 sets of heritage conservation laws in Germany's 16 regional states lies in the system used to determine which objects are in need of protection (...)."*²⁹

4.3 Heritage values and reconstruction

The debate over modernist heritage objects in Germany has given rise to a new kind of discourse concerning the "ranking" of heritage values. This debate revolves around arguments for and against demolition, conservation, and reconstruction. The following quote clearly illustrates the existing leeway for interpretation of the relevant terms:

"The whole theory of monument conservation is (...) something that ICOMOS devotes a great deal of attention to," said Michael Petzet, president of ICOMOS (International Council on Monuments and

(28) http://www.dnk.de/Recht_Gesetz/n2364 (05.03.2014).

(29) Martin, Dieter J.; Krautzberger, Michael (Hrsg.): *Handbuch Denkmalschutz und Denkmalpflege - einschließlich Archäologie - Recht - fachliche Grundsätze - Verfahren - Finanzierung*. - München 2004, pp. 75-99 (77).

Sites) back in 2008. "Sure, we have this famous Charter of Venice, which is our founding document, so to speak. It is still commonly held that the Charter bans reconstruction. But the Charter says nothing of the sort. (...) Hence authentic simply means that which is true and genuine. But this can also be a genuine design. (...) But German experts still don't understand this – for example, the significance of this Nara document.³⁰ Because the discourse in Germany often solely revolves around the historical substance of a given object, to the exclusion of any other consideration."³¹

Docomomo representatives have a completely different take on built heritage conservation, as is shown by, among other things, the debate about the reconstruction of the Meisterhäuser objects in Dessau. In 2008, this debate led to adoption of the Brno Declaration, which states as follows: "In our view, restoring to the condition of 1926 is as wrongheaded as reconstruction projects that aim to eliminate a building's current state of conservation, and particularly the exceptionally evocative state of conservation of modernist buildings. (...) Current urban-object and architectural deficiencies can only be eliminated through contemporary artistic and architectural designs that still respect site specific particularities and factor in the findings of architecture and construction research. While ICOMOS focuses solely on the visual aspect of the row of houses as a whole, Docomomo concerns itself with the heritage value of historically transformed fragments (...)."³²

The current debate concerning built heritage in the former East Germany has also

brought to light various attitudes toward heritage value. For example, do buildings such as warehouses that were constructed of prefabricated concrete elements qualify as monuments? Can architectural solutions resulting from managed shortages of construction materials be regarded as worthy of monument protection? Aren't construction techniques also part of a monument, or is a given object always to be judged by its appearance alone?³³

As a rule, conservation authorities look first at the envelope of an object – and in an urban context at its visual interplay with other objects. But in order to engage further with the historical aspect of a given historic building and thus assess its heritage value as a whole, it is also necessary to holistically consider the building's rooms, spaces, appointments, fixtures and equipment, as well as its structural fabric. Thus it follows that the original colour schemes and surfaces of an object's interior spaces, as well as its appointments, fixtures and equipment also come into play, as a part of the object's aesthetic and age related value.

4.4 How monuments in Tel Aviv should be handled

All of these issues also relate to the manner in which Tel Aviv's heritage objects should be handled. We were unable to determine the extent to which such matters are part of monument conservation discourse and debate in Tel Aviv. Be this as it may, such discourse and debate are important, in that they could promote the understanding of objects – and thus to their conservation.

(30) What is meant here is: The Nara Document On Authenticity (1994), <http://www.icomos.org/charters/nara-e.pdf> (11.09.2014).

(31) Michael Petzet im Gespräch mit Walter Lehner, 2008 <http://www.br.de/fernsehen/br-alpha/sendungen/alpha-forum/michael-petzet-gespraech-100.html> (25.04.2014).

(32) Prigge, Walter: Alles Fassade. Der Streit um die Rekonstruktion der Meisterhäuser. In: Bauhausstreit 1919-2009 Kontroversen und Kontrahenten. Hrsg.: Philipp Oswalt.- Ostfildern 2010, pp. 288–304

(33) These issues were also recently raised at the very well attended event called "Symposium Denkmal Ost-Moderne II – denkmalpflegerische Praxis der Nach-kriegsmoderne." In particular, Roman Hillmann's presentation titled "Tragwerke und Bautechnik als Denkmalwert," aroused debate. Conference program available at: http://www.dbz.de/download/602385/Denkmal_Ost-Moderne_II_-_Tagung_in_Weimar.pdf (29.04.2014).



Figure 27: Bathroom fixtures, Idelson Street 29 in Tel Aviv (2013)

Given the fact that myriad elements of the interiors of numerous White City objects have been preserved in their original state, we feel that it is crucial that these objects be extensively protected. We initially observed numerous elements from the 1930s such as flooring, windows, railings, and lamps – up to and including technical elements, which are in fact few and far between.

Among the preserved elements that are heavily used and are thus in need of replacement are bathroom fixtures, door-knobs, light switches, and lamps.

Insofar as such elements have been preserved in a heritage object that is perceived as such, its owners tend to proudly point out such details, which the owners are usually quite fond of and regard as significant memorabilia. But since, owing to lifestyle differences, the appointments, fixtures and decor elements of private residences are not subject to heritage conservation regulations, the only possible way forward is to raise owners' awareness in this regard through publicity campaigns and the like. We feel that such awareness raising would be a highly useful goal of Israeli monument conservation, and should be folded into the envisaged visitor and heritage conservation centre. In Germany, such efforts are promoted through the establishment of ref-

erence homes or apartments that are open to the public, and that are usually financed by their owners.

4.4.1 *Historic garden conservation*

Many residential buildings in Tel Aviv have striking grounds with lush vegetation that were a core element of Sir Patrick Geddes's vision.

According to Geddes' vision, the White City's residential buildings were to be realized as individual cubes in individual gardens. The goal here was to (a) connect the lushly vegetated interior areas of the blocks with what he termed rose and vine lanes to form richly landscaped interconnected green areas; and (b) create a happy community of residents, improve the local climate, and allow for relaxation, leisure and fruit and vegetable gardening by residents. These rose and vine lanes are part of Geddes's major urban development plan for the expansion of Tel Aviv.

The buildings have small gardens with suitably designed paths, natural-stone borders, terrazzo elements, terraces, flower beds, permanently installed planter boxes, and chairs.

Many of these original grounds have been preserved, although some have probably

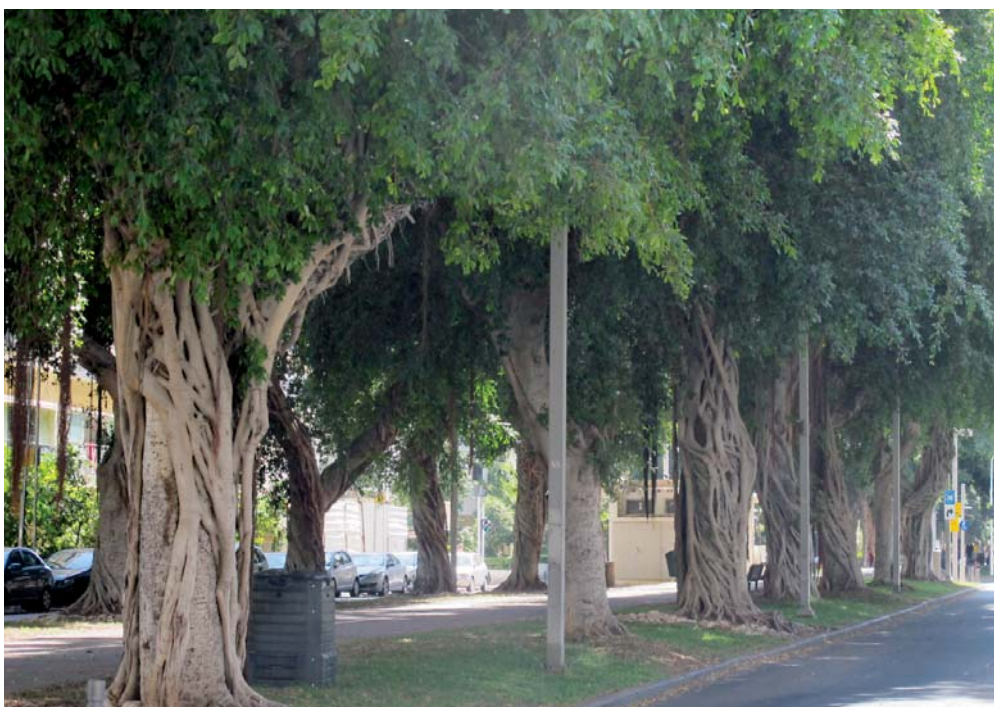


Figure 28: Rothschild Boulevard, Tel Aviv (2013)

been transformed by their vegetation. In many cases, trees that have grown very tall overgrow fences and walls, potentially compromising the structural integrity of building foundations and in some cases leaning right up against building facades. The roots of these trees warp paths and flower-bed borders. Even so, these large



Figure 29: Front yard, Gordon Street, Tel Aviv (2013)

trees are left intact for the shade they provide, and are very much a part of the identity of Tel Aviv. It is noteworthy that Tel Avivians devote far more attention and concern to their grounds than they do to the historic objects where these elements are located. Trees that are endangered are dug up and relocated, at great expense. We were told that in Tel Aviv, trees are rarely cut down.

Thus the conservation and mapping of these home and apartment house grounds should be part of an overall urban planning concept. Such grounds should not be eliminated to make way for parking garages under the heritage objects in question. Conservation of these grounds enables residents to identify with their neighbourhood and makes a significant contribution to the conservation of heritage objects.

The situation is different in Germany, where (a) property owners often go to great lengths to individualize their narrow front yards; (b) ideas (which tend to change frequently) about what constitutes a well structured front yard are determined by fashion – resulting in yards that look very different from each other.

This in turn prompts residents to make major changes in their yards, including completely abandoning the original configuration. The grounds of modernist buildings have in some cases been deliberately eliminated, such as those of the Le Corbusier building in the Weißenhofsiedlung complex, or those of the Modernist Housing Estates in Berlin.

In Germany, historic garden conservation constitutes a conservation discipline unto itself. Guidelines that exceed the scope of individual solutions are available from Vereinigung der Landesdenkmalpfleger in der Bundesrepublik Deutschland (VdL).

Hence, when it comes to the urban-development and authentic impact of buildings, it is clear that residential-object grounds should be factored into the equation. This is an eminently achievable goal in Tel Aviv, in that the grounds in question tend to be in very good condition. But what should be avoided is a park-like reinterpretation of open space, as was done in the Sarona (now Hakyria) apartment complex, whose



Figure 30: Apartment building with mulberry trees, Frug Street, Tel Aviv (2013)

expert report in this domain was unfortunately not implemented, as Israeli experts have reported.

4.5 The structure and impact of Israeli heritage conservation

In Israel, conservation authorities are responsible solely for heritage objects that were built prior to 1700. Israel's Federal Planning and Construction Code of 1965 and its Appendix 31/1991 and the Planning Code of 1965 (as amended in 1996) created an administrative apparatus that is also tasked with overseeing the country's heritage objects.³⁴

Because Tel Aviv's municipal government has sole jurisdiction over the city's historic buildings, no federal authority has the right to interfere with conservation of Tel Aviv's White City, "(...) no government authority is directly responsible for heritage policy."³⁵

It was not until 1990 that the Italian-trained heritage conservation specialist and architect Nitza Metzger-Szmuk established a conservation authority (now known as the Conservation Team) in Tel Aviv's municipal government. Thanks to her tireless efforts (despite a problematic legal framework), awareness of the White City's built heritage has been raised and these objects have been nominated for the UNESCO World Heritage Site list. Metzger-Szmuk commissioned numerous expert reports on buildings in Tel Aviv, and saw to it that key objects were rehabilitated in accordance with good monument rehabilitation practice. In Tel Aviv, successfully rehabilitated objects designed by prominent architects have signs posted on them indicating not only the significance of the architect and building in question, but also the name of the architectural firm that designed the object. The National Master Plan TAMA 35 (1991-1997) identifies an "urban conservation ensemble in central Tel Aviv-Jaffa" and is regularly updated. The Conservation Plan forms the basis for the protection of listed objects. Other relevant instruments are the Tel Aviv Master Plan (1965) and particularly Tel Aviv Ordinance 2659b (2001), which identifies the various zones.³⁶ There are also detailed plans for Tel Aviv and Jaffa that govern conservation measures.

Around 90 percent of the White City buildings that have been nominated for the UNESCO World Cultural Heritage list are privately owned. Our working hypothesis was that most of the historic buildings in the peripheral zones that are not part of the UNESCO White City zones are also privately owned.

Owners' rights are extremely well protected in the Israeli legal system, and thus owners have little difficulty obtaining building permits that authorize them to make changes in their buildings. This also applies to protected buildings, except those that are subject to the highest category of protection. Although such building permits – particularly those that authorize owners to add floors to a building – are ostensibly specific to the piece of property for which they are issued, they can be transferred to other properties with economical compensation.

The city of Tel Aviv regards the transfer of building permits as a satisfactory way to prevent owners from illegally adding floors to heritage apartment buildings in designated protection zones, particularly the UNESCO World Heritage Site zones. On the other hand, building permits are also transferred to developers who build high-rises on the outskirts of the designated zones in exchange for rehabilitating protected historic buildings.

Zones A and C in Tel Aviv pertain to the Geddes Plan from the 1930s. In zone B, under the Lev Hayir Plan from the 1990s, owners are permitted to add floors to historic buildings, provided that the existing structure is fully maintained.

However, in late 2012 Tel Aviv added to National Master Plan 38 a program that allows two and a half earthquake-proof floors to be added to any residential building "(...) *The plan will breathe new life into property development and investment in the city (...) the investment opportunities for Tel Aviv would be immense. (...). There is also call for demolition in the White City of structures not under conservation to make room for new high-rise residential buildings.*"³⁷

In light of all these concessions that have been made to heritage building owners, investors and developers, German heritage conservation experts tend to doubt that

(34) <http://www.israelawresourcecenter.org/israelaw/fulltext/planning-buildinglaw.htm> (14.02.2015)

(35) This quote and those in the sub-sections below from: World Heritage Scanned Nomination. UNESCO Region: Europe and North America. File Name: 1096.pdf. Site Name: White City of Tel Aviv – the Modern Movement. Date of Inscription: 5 July 2003. State Party: Israel. Criteria: C (ii) (iv), p. 57

(36) http://whc.unesco.org/archive/advisory_body_evaluation/1096.pdf

(37) Disson, Sian: Legislation alterations to enable developers to increase building heights in Tel Aviv (12.11.2012) <http://www.worldarchitecturenews.com/index> (25.02.2014)

Israeli heritage conservation regulations can translate into authentically preserved historic objects, because these regulations allow for everything from radical conversion to demolition. The Tel Aviv Conservation Team is part of Tel Aviv's Department of City Planning, which is in turn a sub-department of the city's Construction Department.

Conservation Team architects work on the Conservation Plan, add objects to the protected-monument list, and are in charge of research, monitoring, documentation, the database, restoration projects, and contacting owners. They have trusting relationships with outside consultants.

Inasmuch as, under current laws and circumstances, the Tel Aviv Conservation Team is in a relatively weak position vis-à-vis heritage building owners, their PR in Tel Aviv is of particular importance. For the only way to fundamentally change the mindset of owners is to ensure that they are well informed about monument protection issues.

4.6 Documentation and construction research as a basis for heritage building rehabilitation

In order to lay the groundwork and provide support for complex rehabilitation measures for protected objects, it is necessary for those concerned to be knowledgeable about the objects in question, including in terms of their history, construction, surfaces, and immobile furnishings. Only on such a basis can sound professional planning unfold.³⁸ This has for many years been a consensus view of all German heritage conservation authorities; it is also found in the guidelines issued by such authorities and in the advisories issued by the relevant professional organization (Vereinigung der Landesdenkmalpfleger). But unfortunately, heritage-authority budget cuts and restructuring have also resulted in a situation where this expertise and basic research are no longer realized within the agencies themselves, using their own personnel.

Hence heritage officials have a special responsibility toward and need to set a good

example for private sector construction research and documentation companies. The sphere of responsibility of such agencies also includes "(...) exemplary realization and assessment of construction documentation (...)" through the use of cutting edge measurement methods, and combining them with other investigation methods, with the goal of evaluating their usefulness for monument conservation.³⁹

In Germany, relative to the situation in other countries, construction documentation and research methods are in pretty good shape thanks to the methodological debate that was conducted in these disciplines for many years. The polarized views that once characterized the various factions in this debate appear to have been largely overcome – although the search continues (as is only right) for optimal methods in the various disciplines. The key considerations in this regard are as follows: applying suitable investigation and implementation methods; adhering to scientific standards; the willingness of construction researchers (and their clients) to base their calculations not only on their bottom lines, but also to understand the particularities of the objects in question and to incorporate the ever-deeper insight thus gained into the relevant documentation.

Only in this way can small and unprepossessing findings, which are often key to understanding the particularities of an object, in fact be plotted and evaluated. The knowledge gained from on-site findings, descriptions, and measurements forms the basis for the fulfilment of monument conservation goals for the object being investigated.

Particularly when it comes to protected ensembles of heritage objects, it is crucial to always draw attention to this. This applies not only to UNESCO World Heritage Sites, but also to "ordinary" historic objects – which, after all, is what conservation authorities devote most of their time to. For the vast majority of objects within ensembles, and particularly in densely built up city-centre UNESCO zones, specific issues arise on a case by case basis that can only be addressed through conscientious condition surveys. In Germany, too, such surveys and support for the relevant measures need to be encouraged, including in the public sphere. According to one author,

(38) Qualitätsstandards für bauhistorische Untersuchungen im Kontext von Sanierungsmaßnahmen. Arbeitsblätter der Vereinigung der Landesdenkmalpfleger der Bundesrepublik Deutschland 43, 2013 http://forum.db.rjm.de/data/akt/Arbeitsblatt_Qualitaetsstandards_FERTIG_2013_07_10_ohne_rot.pdf (05.03.2014)

(39) <http://www.denkmalpflege-bw.de/service/stellenausschreibungen.html> (30.01.2014)

monument conservation invariably suffers – the UNESCO Lübeck old-city project being one example – when construction or rehabilitation is inadequately documented.⁴⁰

The historically accurate rehabilitation realized under the Wüstenrot Foundation heritage program is exemplary, mainly by virtue of its excellent published documentation. The professional journals issued by the various heritage conservation authorities embody the current standards for construction research and the documentation thereof.

4.6.1 Conservation documentation using a room book

Conservation documentation using room books was developed in Germany beginning in the 1980s, and has become a well established practice, along with the traditionally most precise surveys that document findings and damage.

“A room book is a form of as-built documentation. Each such book is elaborated as follows: the building rapporteur systematically visits each room in the building, noting down the historic attributes and features that he is able to detect without the use of special instruments or equipment.”⁴¹

a) Digital room books

For our research, all information concerning the buildings in Tel Aviv and Germany was compiled in digital form. To this end, the Digitales Raumbuch (digital room book) platform, which was developed by Büro für Restaurierungsberatung, was customized for the specific requirements of our research.

Use of a digital room book greatly expanded the possibilities available to us, relative to the use of an analogue room book. As an adjunct to an analogue monument-conservation room book, which pertains to as-built documentation via texts and photographs, a digital room book allows for the compilation and complete presentation of buildings via all available digital information such as texts, pictures, plans, audio files and video files.

A digital room book allows for the compilation, documentation, and evaluation of all site-related information. The structure, building-element descriptions, and evaluations are modelled on EN 16096: 2012 (“Conservation of cultural property. Condition survey and report of built cultural heritage”).

The digital room book was elaborated using the Drupal content management system,⁴² which is open source software that is used worldwide. The attributes of the digital room book are as follows:

- The digital room book is filed in a Cloud, so that workstation software licenses are not necessary and the software can be accessed from anywhere. This allows all concerned to work together on a uniformly structured database.
- Users can communicate with each other via standard exchange formats from other documentation systems, via import-export interfaces.

Accessing the digital room book

The digital room book can be accessed via <http://telaviv.restaurierungsberatung.de/>. Research-group users only need to be allocated a user name and password to access this tool.

Site groups

Specific sites are accessed via the two site groups, which are called Deutschland and Israel. All results that meet the relevant search criterion are shown on each site.

Mapping

Mapping involves site mapping on a GIS based map using layers. Mapping automatically uses the EN 16096 classification system from the various room books such that, for example, a map of Tel Aviv will show the sites of the four buildings being investigated. Their respective recommendation classes (RCs) are indicated by their respective marking colours.

Room books and pages

An unlimited number of room books containing an unlimited number of room or object pages can be created for each site (i.e. a heritage object). Each room book allows for allocation of an EN 16096 classifi-

(40) Finke, Manfred (Hrsg.): UNESCO-Weltkulturerbe. Altstadt von Lübeck. – Lübeck 2006, p. 301. The author refers to three projects: Königspassage, 1992; Ägidienhof construction, 1996; dividing Ägidienhof into apartments, 2006.

(41) Schmidt, Wolf: Das Raumbuch. Arbeitsblätter des Bayerischen Landesamts für Denkmalpflege (Loseblattsammlung), Mai 1994, p. 1.

cation. An extensive book (and the attendant pages) was elaborated for the Idelson 29/Dov Karmi object.

b) Documentation of the measures realized

Heritage-object documentation that is as complete as possible is mission-critical for all members of the monument conservation community. Based on the documentation of the original object, the scope of this documentation grows with every passing year for each object. The extensive range of possible measures such as rehabilitation, renovation, restoration, reconstruction, and repairs gives rise to many different types of information. In some cases, the historic structural details of a building or its technical construction details come to light. Such events expand the scope of the object documentation, and need to be systematically recorded and indexed, so as to make such documentation available to all conservation stakeholders. Particularly when it comes to restoration, international best practice is to be followed, to the effect that all restoration measures must be documented via texts, photos and drawings. This procedure was set forth in 1964 in Article 16 of the Charter of Venice and has become best practice

for heritage conservation in a great many countries.

c) Building maintenance and upkeep plans

The natural aging of a building, the weathering of its outer materials, and the wear and tear incurred by the building's interior are all part and parcel of its heritage-object nature, and thus constitute a key historical record. Continuous maintenance can slow down this aging process and mitigate its external impact.

Every object, including those built in the 20th century, needs such continuous maintenance. That said, a listed protected building entails a special obligation to maintain the object properly using suitable materials and methods. This requirement is also laid down in the Charter of Venice.

When it comes to maintenance, it is useful to carry out regular inspections and to draw up a schedule that forms a mandatory basis for such inspections and maintenance. In this context, the room book described above can be extremely useful, in that such measures can also be incorporated into the program.

In Germany, heritage-object maintenance is standard operating procedure. Germany



Figure 31: Screenshot (Tel Aviv) of a digital room book, showing mapping using one layer. All information can be readily accessed via the menu on the right. Basis is the OSM Mapnik plan.

of course also has numerous heritage objects that are in deplorable condition, because their owners are unwilling or unable to maintain these objects, and it is simply not possible to force building owners to rehabilitate their buildings in a manner that will ensure their conservation. In Germany, as in other countries, when it comes to ensuring that long overdue maintenance is actually carried out, experience is key, as is personal contact between object owners and the companies that carry out conservation measures.

One publication containing conservation guidelines states as follows:

*"Observation and upkeep protect heritage objects, and at the same time constitute the most cost effective conservation measures. Buildings and structural details that are well maintained on a regular basis reduce upkeep and maintenance costs."*⁴³

These guidelines were elaborated in collaboration with the restoration task force of the Vereinigung der Landesdenkmalpfleger for all of Germany's regional states. These recommendations pertain to precautionary measures such as ventilation, weather protection, lightning and fire safety, anti-theft measures, window protection, drainage, inventory, condensate-water channels, downspouts, window shades and shutters, and anti-bird measures. The recommendations are equally exhaustive on the subject of building inspections and upkeep. They also address numerous subsidiary topics concerning object environs and exteriors. For example, the section on building interiors covers the following: roofs; plaster; ceilings; walls; windows; doors; floors; ventilation; heating; electrical systems. The most helpful aspect of these guidelines is that they delve into all relevant materials, and contain detailed and useful passages on upkeep, maintenance and recommendations.

A section titled "Who should perform maintenance and upkeep for what?" provides useful information as to which stakeholders are responsible for carrying out which measures. The guidelines also contain various inspection checklists that can be used to elaborate checklists for specific buildings. Likewise included is a specimen maintenance contract that can be used to

conclude such a contract with an outside maintenance company.

A further aspect of maintenance is the impact of restoration measures on flora and fauna – a factor that is relevant for Tel Aviv in light of its lush vegetation. Compensatory ecological measures need to be planned and justified, just as structural changes in a heritage object do. This is accomplished primarily through flora surveys and mapping, in accordance with the tenets of nature conservation and monument protection. This does not apply, however, to building-statics issues or to structurally compromising deformations in a building, which take precedence over ecological surveys.⁴⁴

(42) <http://www.drupal.de/> (20.01.2014)

(43) Kühlenthal, Michael (Bearb.): *Vorsorge, Pflege, Wartung. Empfehlungen zur Instandhaltung von Baudenkmalern und ihrer Ausstattung* (Denkmalpflege Informationen Ausgabe A 88). – München 2002, p. 10, translated from German

(44) Pick, Robert; Beyer, Stefan; Drewello, Rainer (et al.): *Instandsetzung von ökologisch bedeutsamen Mauerwerk. Die Wallmauern der Festung Rosenberg in Kronach*. In: *Vorsorge, Pflege, Wartung. Empfehlungen zur Instandhaltung von Baudenkmalern und ihrer Ausstattung* (Denkmalpflege Informationen Ausgabe A 88). Bearb.: Kühlenthal, Michael. – München 2002, pp. 47–54.

5 Energy upgrading in accordance with good practice heritage conservation

5.1 Introduction

Unlike Germany, Tel Aviv, being located in the Mediterranean region, enjoys relatively warm temperatures year round. But the city is affected not only by its maritime climate, but also by hot winds from inland.

Hence German experience with upgrading building energy efficiency is applicable to Israel to a limited degree only.

The extremely high summer temperatures in Tel Aviv, in conjunction with lengthy periods of sunshine, necessitate special measures when it comes to keeping buildings cool. Israel's local Arabic construction tradition had responded to these climatic conditions by using particular kinds of ground-plans and largely windowless exterior facades. That said, the White City buildings discussed in this report exhibit a different approach, one that is based on Central European ground-plan concepts, and the use of large windows and protruding balconies. The White City's original architects and builders were aware of these factors, and endeavoured to intelligently combine shade and ventilation.

So today, as in the past, the most urgent energy-saving goal for the objects in question here is to achieve efficient protection against the heat during the summer, by installing facade shading elements and combining them with ventilation elements. But the structural envelope elements need to be factored into the equation as well, i.e. the manner in which windows and walls, as well as roof and facade structure, are realized. For Germans, another factor that comes into play is the use of the available solar energy, through the use of solar thermal energy and photovoltaic solar energy.

Following a thorough analysis of Tel Aviv's climate during the various seasons, we will address here the structural fabric of the buildings in question in the interest of gaining greater insight into the key structural and building-physics factors that come into play.

Hence the solutions proposed here are based on these types of findings, as well as on our exchanges with experts on installation modernization.

5.2 Tel Aviv's climate

Energy efficiency can best be achieved for Tel Aviv buildings by improving building cooling and the thermal insulation of building envelopes. Winter thermal insulation, which is so crucial for the structural design of residential buildings in Germany, plays only a minor role in Israel.

Tel Aviv weather data (temperature, relative humidity, wind velocity, and global solar radiation), which is shown in the graphics below, was compiled using Meteonorm software,⁴⁵ as mean hourly values from 2000 to 2009.

According to this data analysis, the mean outdoor temperature in the winter is 13 °C and in the summer 27 °C, with daily highs of up to 35 °C at noon (see Figures 32 and 33), which exceed the comfort level for Tel Aviv residents.

However, except on scorching days, the city's nocturnal breezes bring summer temperatures down to around 23 °C. This large difference amounting to an 8 K temperature spread, is highly significant from a building-physics standpoint, in that it harbours considerable potential for the passive cooling of buildings. This potential, which was recognized already back in the 1930s, is reflected by many architects' residential ground-plans, which configure windows and door openings in such a way as to allow for cross-ventilation. This method for cooling-off buildings at night should also be exploited today.

As with temperatures, the 60% mean relative humidity in Tel Aviv (see Figure 34) theoretically translates into moderate conditions.

The relative humidity in the Tel Aviv metropolitan area fluctuates over the course

(45) Meteotest Department, Switzerland

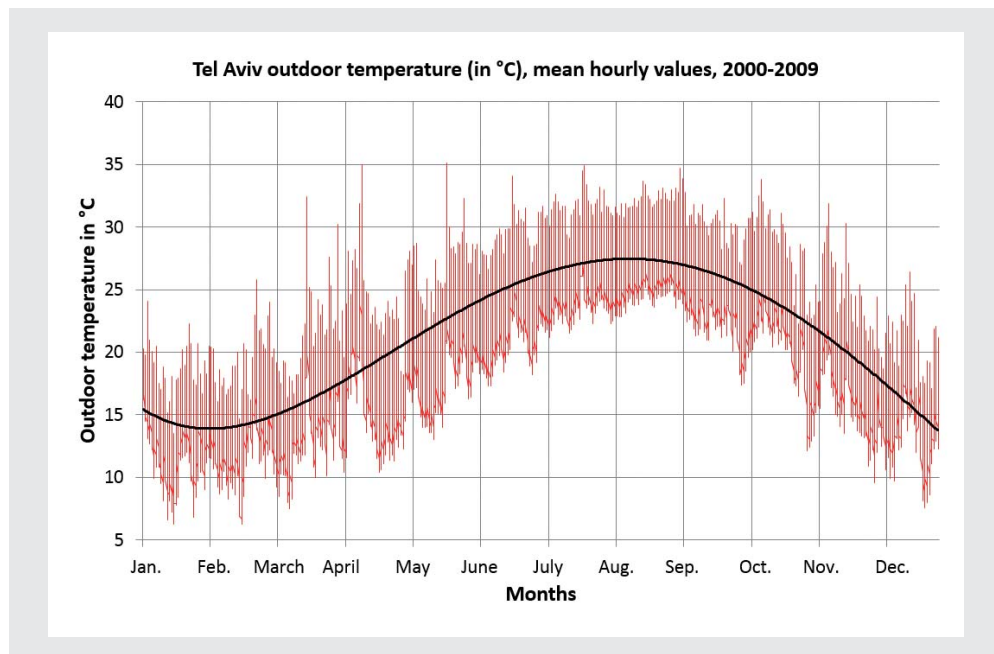


Figure 32: Mean hourly outdoor temperatures for 12 month periods in Tel Aviv, from 2000 to 2009

of a day, in accordance with temperature fluctuations.

The temperature drop that occurs at night results in an increase in relative humidity, which, on the other hand, decreases considerably during the day relative to relative humidity (see Figure 35). Hence summer days in Tel Aviv are hot and dry, and residential building facades undergo considerable calefaction.

At the same time, the prevailing winds in Tel Aviv play an important part in cooling-off the city's buildings, which are very close together and which, despite the scorching heat, keep temperatures relatively comfortable on the street and in small parks. Hence in analysing weather conditions, it is important to take into consideration the fact that at noon (a) outdoor temperatures peak; and (b) wind velocity increases considerably. The wind evaporation effect

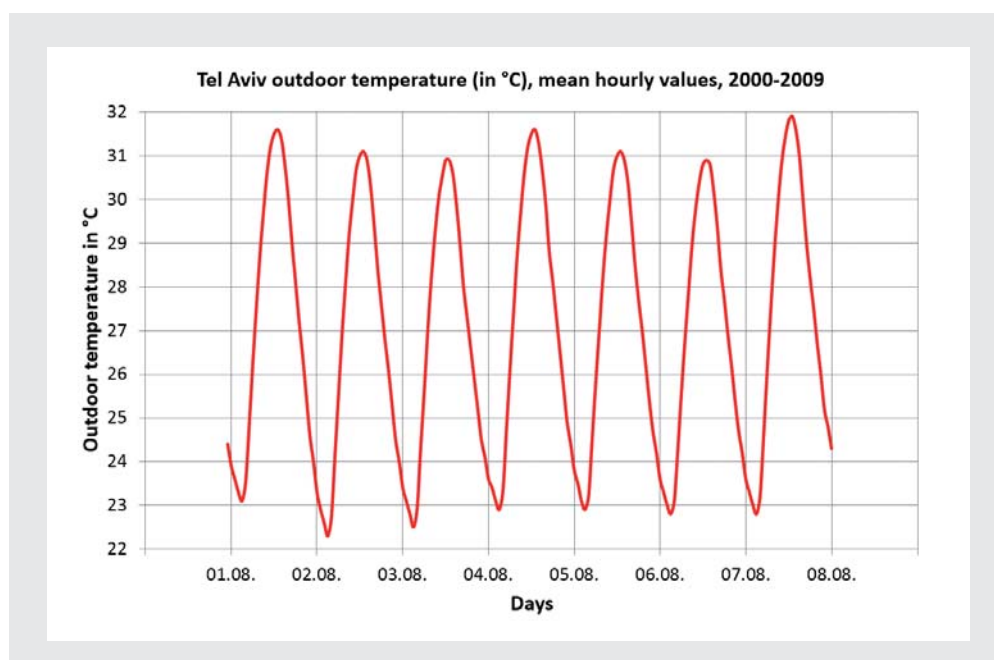


Figure 33: Mean hourly outdoor temperatures in the first week of August in Tel Aviv, from 2000 to 2009

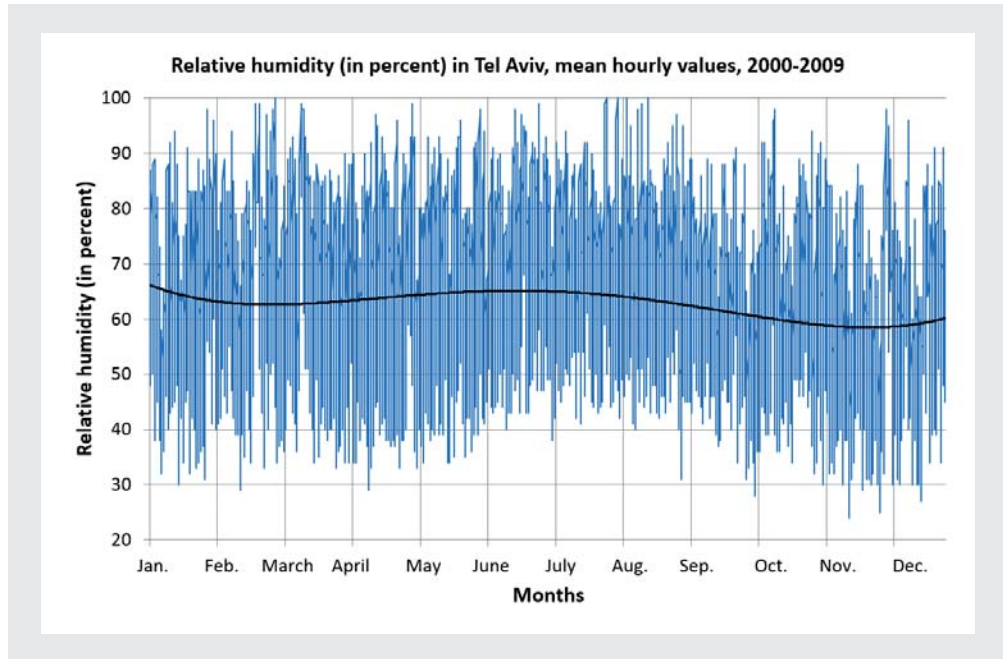


Figure 34: Mean hourly relative humidity for 12 month periods, in Tel Aviv, from 2000 to 2009

makes the climate considerably more comfortable during the hottest times of the day.

The average wind velocity in Tel Aviv is 4 m/s (see Figures 36 and 37), which on the Beaufort scale⁴⁶ qualifies as a "moderate breeze". As can be seen in Table 2, despite a virtually constant mean wind velocity amounting to 4 Beaufort, gale-like

gusts blow through Tel Aviv virtually year round, allowing for both cooling and ventilation of the city's streets and urban space.

The bottom line here is that combinations of temperature and relative humidity can create climatic conditions that are experienced as either comfortable or uncomfort-

(46) The Beaufort scale, which was developed in 1806 by Admiral Sir Francis Beaufort (1774—1857) of Britain, is used to evaluate the impact of prevailing winds, on a scale from 0 to 12.

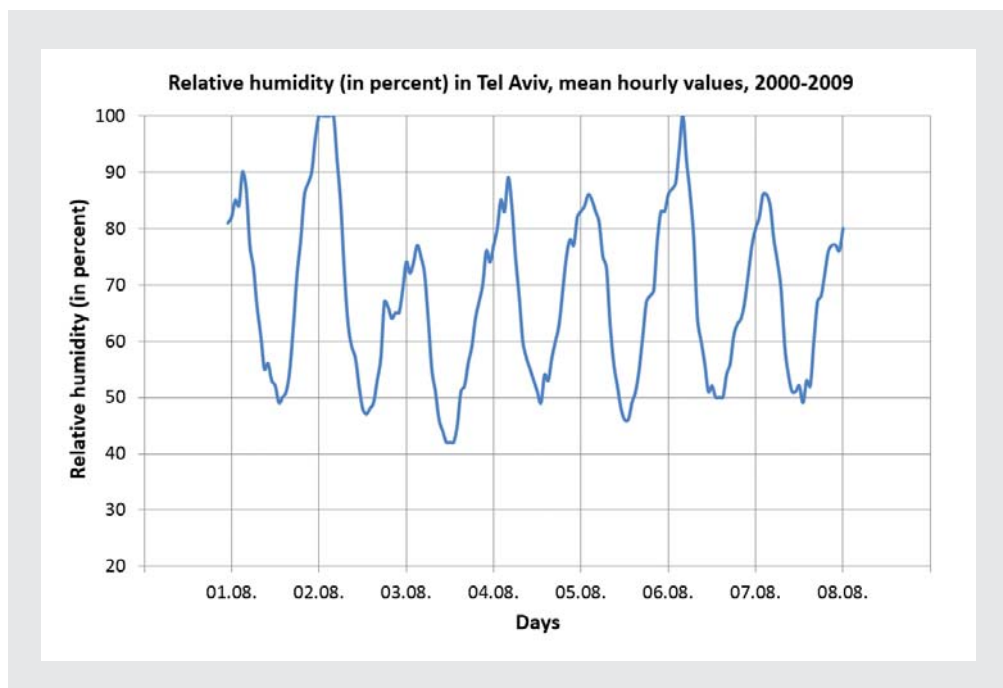


Figure 35: Mean hourly relative humidity in the first week of August in Tel Aviv, from 2000 to 2009

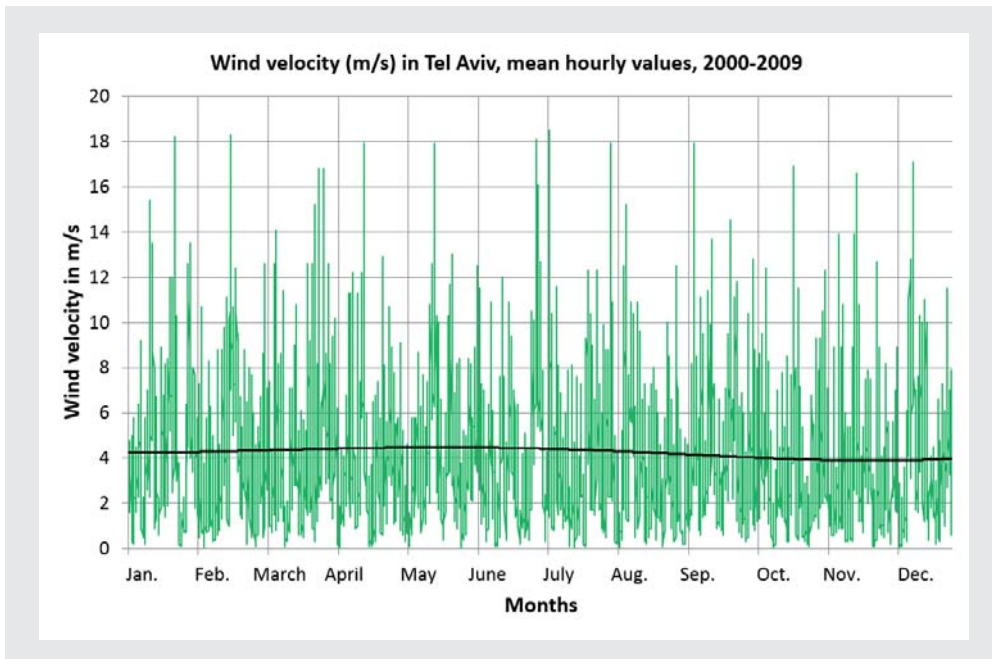


Figure 36: Mean hourly wind velocities for 12 month periods in Tel Aviv, from 2000 to 2009

able. This phenomenon was investigated from a general standpoint as early as 1951 by Leusden und Freymark and is illustrated in the graphics below.

The ambient conditions in building interiors are comfortable for occupants when the prevailing relative humidity is around 50% and the temperature is between 20 °C

and 24 °C. In such settings, wind velocity should ideally range from 0.2 to 0.3 m/s. When room temperature falls below 19 °C, occupants feel the need to heat the space; when room temperature rises above 24 °C, they feel the need to cool the space.

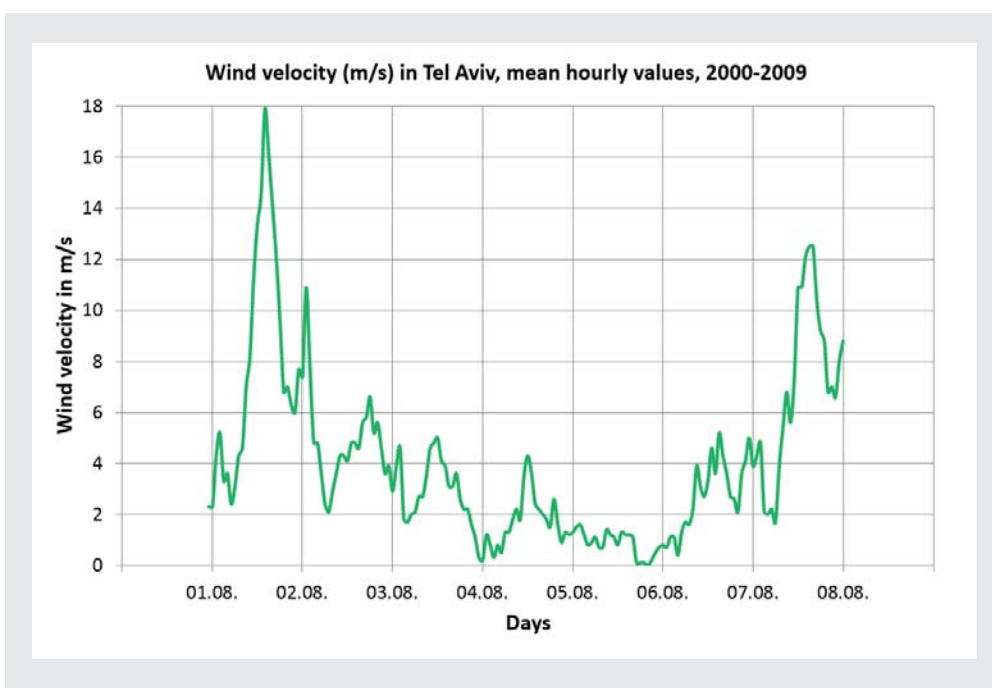
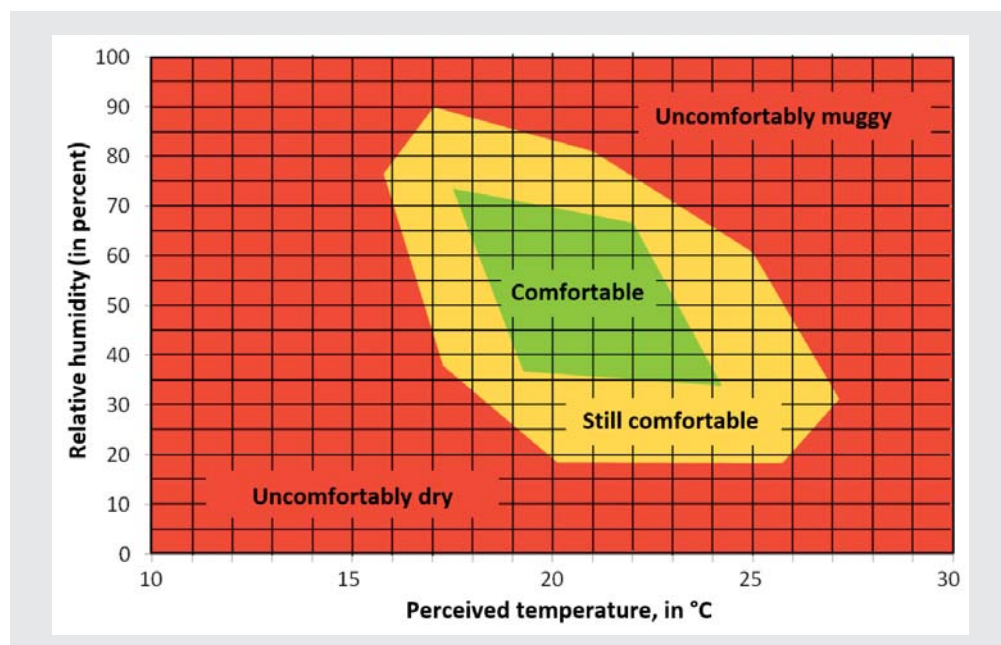


Figure 37: Mean hourly wind velocities in the first week of August in Tel Aviv, from 2000 to 2009

Table 2: Beaufort wind velocity assessment scale ⁴⁷

| Beaufort gradient | Descriptive term | Mean wind velocity at 10 meters above open ground | | Examples of the impact of wind on inland areas |
|-------------------|-------------------------------|---|----------------|--|
| | | m/s | km/h | |
| 0 | Calm | 0 – 0.2 | < 1 | Smoke rises vertically |
| 1 | Slight draft | 0.3 – 1.5 | 1 – 5 | Wind direction indicated by smoke drift |
| 2 | Light breeze | 1.6 – 3.3 | 6 – 11 | Wind felt on face; leaves rustle; ordinary vanes moved by wind |
| 3 | Slight breeze/slight wind | 3.4 – 5.4 | 12 – 19 | Wind moves small twigs and makes pennants flat |
| 4 | Moderate breeze/Moderate wind | 5.5 – 7.9 | 20 – 28 | Raises dust and loose paper; thin branches are moved |
| 5 | Fresh breeze Fresh wind | 8.0 – 10.7 | 29 – 38 | Small trees in leaf begin to sway; crested wavelets form on inland waters |
| 6 | Strong winds | 10.8 – 13.8 | 39 – 49 | Large branches in motion; whistling heard in telephone wires; umbrellas used with difficulty |
| 7 | Near gale | 13.9 – 17.1 | 50 – 61 | Whole trees in motion; restraints felt when walking against wind |
| 8 | Gale | 17.2 – 20.7 | 62 – 74 | Twigs break off trees; progress generally impeded when walking |
| 9 | Strong gale | 20.8 – 24.4 | 75 – 88 | Slight structural damage occurs. Roofing dislodged; larger branches break off |
| 10 | Storm | 24.5 – 28.4 | 89 – 102 | Trees uprooted or broken; considerable structural damage |
| 11 | Violent storm | 28.5 – 32.6 | 103 – 117 | Widespread damage |
| 12 | Hurricane | 32.7 and higher | 118 and higher | Widespread severe damage |



(47) Deutscher Wetterdienst (2014). Wetterlexikon – Beaufort-Skala. <http://www.deutscher-wetterdienst.de/lexikon/index.htm?ID=B&DAT=Beaufort-Skala> (26.05.2014)

(48) Leusden, F. P.; Freymark, H.: Darstellungen der Raumbehaglichkeit für den einfachen praktischen Gebrauch, Gesundheitsingenieur 72 (1951) Heft 16, pp. 271 – 273.

Figure 38: Comfort for sedentary activities, as a function of temperature and relative humidity⁴⁸

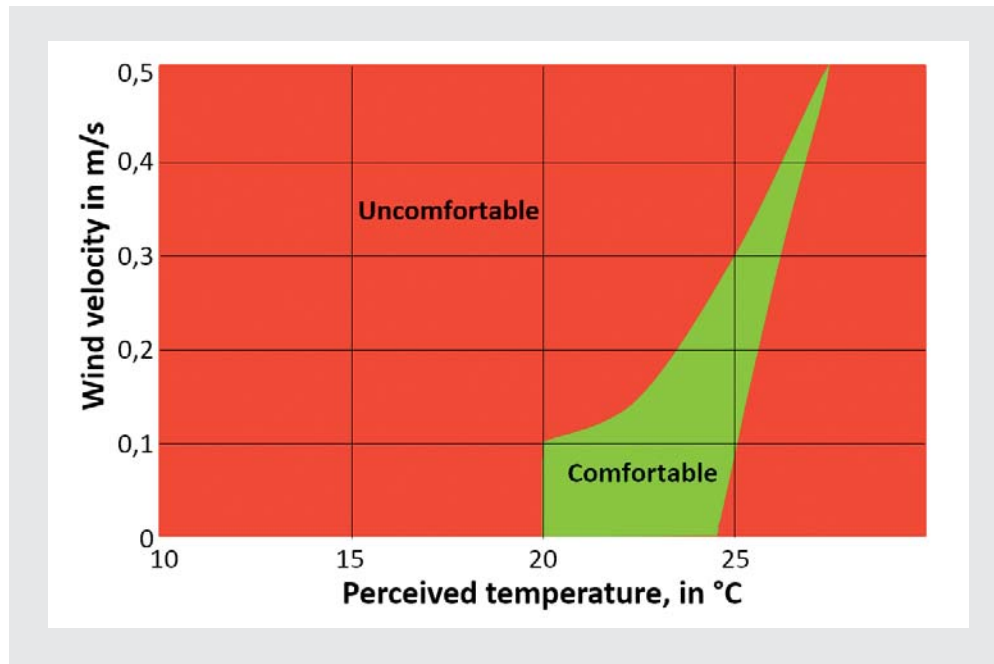


Figure 39: Comfort for sedentary activities, as a function of temperature and air flow⁴⁹

5.3 Thermal insulation versus air conditioning in the summer

5.3.1 Shading and ventilation

European-trained Tel Aviv architects who adhered to the principles of the Modern Movement and the International Style made abundant use of horizontal ribbon windows as an expression of a new mindset, as can be seen in objects designed by Le Corbusier, Gropius, Mendelsohn and many other architects of this period. However, unlike European windows, these windows for the most part have deep, shaded balconies in front of them that look like dark, horizontal facade zones from the outside. Many such balconies are afforded additional protection against the mid-day sun by extremely wide balcony skirting (see Figure 94).

Thanks to these structural features, rear apartments in particular are well protected against sunlight over the course of a given day.

Ground floors are in many cases shaded by upper floors cantilever over the building entrance, as Zeev Richter did, for the first

time, in his Engel house – thus successfully circumventing the then building code.

Buildings being set back from the street not only make for an optically wider street and provide shade for the lobby entrance, but also allow for considerably better air circulation in the street – which in turn creates a cooler microclimate in the adjoining spaces (see Figure 41).⁵⁰ This air circulation is most noticeable at street intersections; small air eddies at building entrances help to keep temperatures comfortable.

Shade was also successfully created by the following: awnings (Figure 42); wooden roller blinds and cantilevered slabs (Figure 43). Vertical slats were also used to create shade on balconies.

Still today, these diverse shading measures help to keep direct sunlight out of building interiors. In the absence of such exterior shading elements, direct sunlight would pass through the glazing into the interior, where it would strike furnishings and structural elements and would be absorbed by room surfaces and partly converted into heat. This phenomenon makes sunlit objects and structural elements very hot within a very short space of time, and depending on the particularities of the space

(49) Willems, M. W. (Hrsg.): Lehrbuch der Bauphysik. – Wiesbaden 2013

(50) Geva, Anat: Rediscovering Sustainable Design through Conservation. Bauhaus Apartments in Tel Aviv. Association for Conservation Technology International (APT) Vol. 39,1 (2008).



Figure 40: Light coloured plaster facade with small windows, most of which are recessed and are thus shaded by the balconies; Idelson Street 29, Tel Aviv (2013)

in question, the surface temperatures of such elements can go as high as 50 °C and propagate long-wave infrared radiation in building interiors. This radiation is conducted outwardly through building glazing to a limited degree only; most of the heat is trapped inside, driving up indoor temperatures to an uncomfortable level.

Hence the following principle holds true for Tel Aviv, as it does for other cities: For energy balancing purposes, solar energy input reduction is designated as "S" (solar input value). The lower this value, the less solar radiation is conducted indoors that needs to be counteracted using cooling measures. The "S" value is based on window size, the consequent total glazing en-



Figure 41: Here, a ground floor entrance that is open to the street translates into an optically wider street and provides shade for the building entrance (Tel Aviv, 2013)



Figure 42: Shade created by awnings (Tel Aviv, 2013)

ergy transmittance, the reduction factor (F_c) for permanently installed shading elements, and the net surface area ($S = A_{\text{window}} \cdot g_{\text{glazing}} \cdot F_c / A_{\text{net surface area}}$).

An efficient passive heat removal method used in the staircases of Tel Aviv buildings are that they nearly always have vertical ribbon windows (“ther-

mometer” windows), whose strong chimney effect allows for ventilation when they are open at both the top and bottom (see Figures 44 and 45). The original configuration of the apartment house lobby entrances was different from that of today, however. Many such entrances that face the street only had swinging double doors that provided



Figure 43: Shade created by cantilevered cement slabs (left) and roller blinds (right) (Tel Aviv, 2013)



Figure 44: Vertical ribbon windows that allow for staircase ventilation; Idelson Street 14 (Tel Aviv, 2013)

(51) Rediscovering Sustainable Design through Conservation: Bauhaus Apartments in Tel Aviv Author(s): Anat Geva, with reference to: Helen Meiler, Patrick Geddes: Social Evolutionist and City Planner (London: Routledge, 1990), 279–280. Shavit and Biger, 203. Anat Geva, "The Paradox of Climatic Compatibility of Bauhaus Apartment Buildings in Tel Aviv, Israel" in *Merchavim: Studies in Geography of Israel and the Middle East*, vol. 6, Climate and Environment, Efrat Elisha, Hadas Saaroni, and Oded Potcher, eds. (Halon, Israel: Ofir Publishing, 2006), pp. 175–198.

ventilation. Many of these doors have been replaced by security doors.

Cantilevered facade slabs (Figure 46) and vertical slats (Figure 47) also capture the ocean breeze, and in combination with windows and open balcony contours, bring fresh air into buildings. Thus, rooms are

cooled by cross-ventilation, and apartments are cooled at night (Figure 51).

With the prevailing winds, as well as architectural solutions for nocturnal cross-ventilation in mind, the Geddes Plan already called for ventilation solutions that were implemented in the 1930s and that still work today.⁵¹

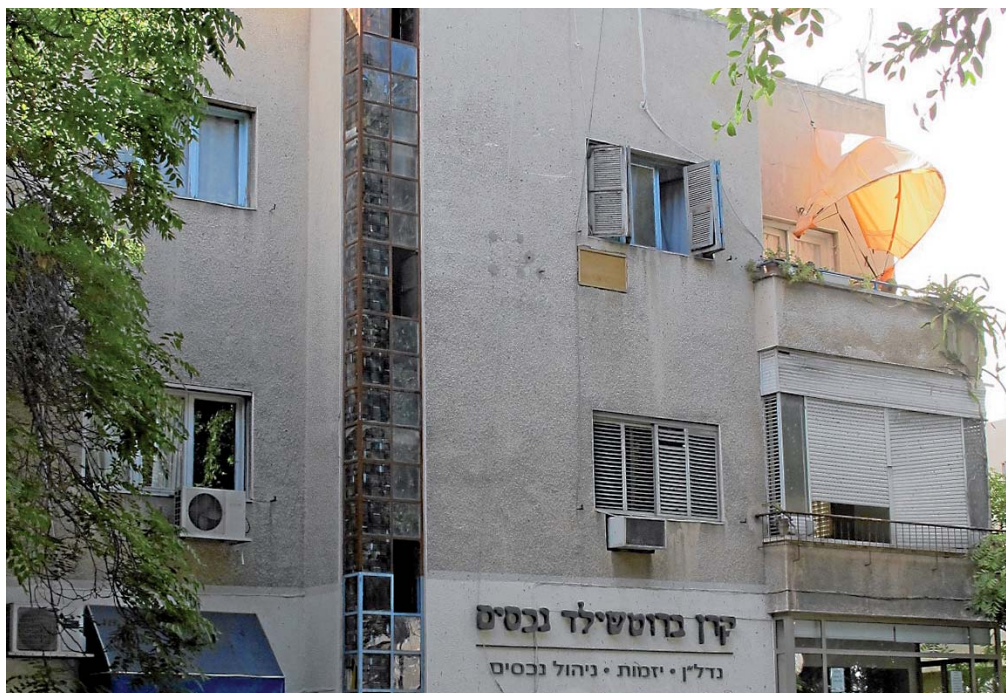


Figure 45: Vertical corner ribbon windows that allow for staircase ventilation (Tel Aviv, 2013)



Figure 46: Cantilevered facade slabs (left) capture the ocean breeze (Tel Aviv, 2013)

As one author puts it, "Geddes advised orienting the streets to eliminate direct sun from the south and capture the western breezes from the sea. His guidelines recommended small, shaded windows and flat roofs and called for facades washed with bright colours."⁵²

This was done not out of a concern for sustainability and resource conservation (as would be the case today), but instead owing to the fact that, because air conditioning was not feasible for residential buildings at the time, it was necessary to make the best possible use of natural ventilation solutions.

(52) Geva, Anat: Rediscovering Sustainable Design through Conservation. Bauhaus Apartments in Tel Aviv. Association for Conservation Technology International (APT) Vol. 39,1 (2008).



Figure 47: Vertical slats capture the ocean breeze and provide shade (Tel Aviv, 2013)

These techniques were abandoned or disregarded in the ensuing years for the following reasons: the rapid growth of Tel Aviv's population; the growing need for residential space and the consequent scarcity of such space; the increasing demand for modern comforts. In a great many cases, balconies were closed off by frontal structures and were incorporated into apartment interiors (see Figures 48 and 49). Security concerns also played a role here.

Fully glassed-in balconies allow solar radiation to stream into apartments unimpeded. As a result, the heat remains in the former balcony space, heating them up in the manner of Central European winter gardens. The heat in these spaces can only be eliminated through the use of extensive ventilation systems that use a lot of electricity.

Because the passive cooling solutions that formed the basis for the buildings we studied simply cease to function if balconies are glassed-in, these spaces are cooled nowadays with air conditioning. If cross-ventilation cannot on its own sufficiently reduce indoor temperatures, it can at least contribute to room cooling – and of course at no additional cost. In short, Tel Aviv's

unshaded glassed-in balconies ramp up energy demand.

The extremely large amount of electricity that is used for air conditioning in the summer should by rights be factored into the heating needed in the winter. On account of Tel Aviv's mild climate, summertime energy consumption can greatly exceed the energy used for heating – which in any case is now provided by combination air conditioner-heater units that are installed on the facade, just outside each apartment.

Tel Aviv heritage buildings that were constructed during the city's 1930s construction boom were suitably designed for the prevailing climate. The ceilings and support elements of most White City residential buildings are constructed of reinforced concrete, while the other walls are lime sandstone. The impressive solidity of these buildings is embodied by their excellent thermal storage capacities, which is attributable to their wall thickness, gross density, and specific thermal capacity, all of which factor in the thermal conductance capacity of the materials used. Thanks to the excellent thermal storage capacity of the walls and ceilings, these elements absorb and store large amounts of the heat that is conducted into apartments on summer days.



Figure 48: Glassed-in corner balcony (Tel Aviv, 2013)



Figure 49: Glassed-in balcony with interior shading elements (Tel Aviv, 2013)

When the sun goes down, thanks to the large difference between day and night temperatures, this heat is removed from the structural elements via targeted and controlled nocturnal cooling. One of the main effects of this asynchronous dissipation of the heat stored in the solid structural elements of these buildings is that the interiors are heated.

This in turn allows for use of the heat storage capacity of the walls and ceilings during the next day. Hence ceilings and interior walls act as a thermal buffer that makes a key contribution to creating comfortable ambient conditions.

In winter, the shading elements are left open or are removed, so as to allow the solar radiation that comes into the building through the windows (at a shallow angle) to be used for space heating purposes.

This hypothesis was confirmed in 2008 by simulations of the energy efficiency of the building at Idelson Street 29 in Tel Aviv.⁵³ This assessment is significant primarily because the building in question may end up being the site of the envisaged White City visitor and heritage conservation centre. If the simulation findings are in fact transposed to this facility, the building can be

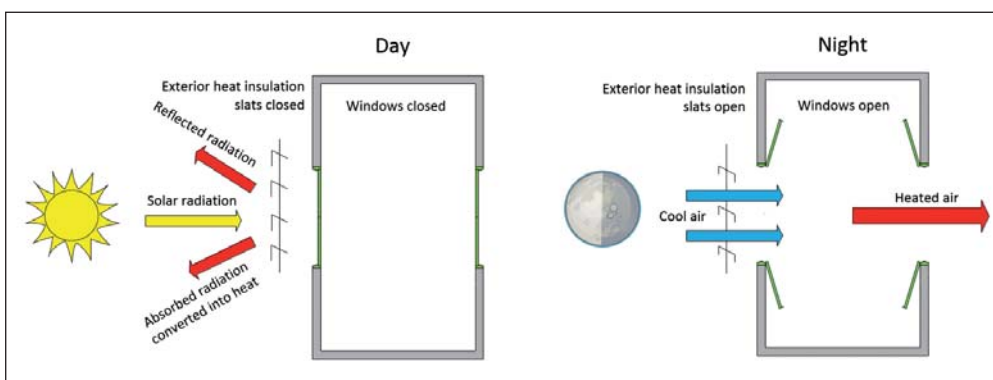


Figure 50: As can be seen here, solar radiation strikes the shading elements during the day and is thus for the most part reflected⁵⁴

Figure 51: As can be seen here, at night rooms are cooled by cross-ventilation⁵⁵

(53) Geva, Anat: Rediscovering Sustainable Design through Conservation. Bauhaus Apartments in Tel Aviv. Association for Conservation Technology International (APT) Vol. 39,1 (2008).

(54) Graphic by Christian Blatt

(55) Graphic by Christian Blatt

used to empirically demonstrate the validity of the aforesaid hypothesis.

Geva took into consideration the following simulation scenarios:

1. The building in its original state, i.e. as it was in the 1930s.
2. The energy-inefficient change made in the building in 1992 – namely glassing-in the balconies.
3. Restoration of the building in 2000, which also included installing air conditioning.

Our investigations of 1930s buildings that have been left intact revealed that a comfortable room temperature cannot be maintained without air conditioning, in the event of a heat wave (outdoor temperature hovering around 35 °C for a number of days). That said, in view of the architectural particularities of these buildings, it is in all likelihood possible to make only minimal use of air conditioning in them, and thus achieve energy efficiency.

Air conditioners should be equipped with thermostats. Via an acoustic signal, room occupants can be warned that they have left their balcony doors or windows open with the air conditioning on – an oft-observed phenomenon in Tel Aviv.

Energy efficiency can also be greatly improved through measures such as installing exterior shading elements, so as to increase the building's shade gradient.

It is crucial that (a) rooms that become warm during the day be cooled off at night by cross-ventilation; (b) ventilation elements be regulated during the day for maximum efficiency; and (c) systems be used in accordance with room and outdoor temperature (see Figure 52). Occupants need to shut their windows as soon as the morning outdoor temperature exceeds room temperature.

This is particularly important in cases where thermal insulation has been added to a building or apartment.

According to one study (a) additional insulation of buildings that are not shaded during the day and that do not have con-

tinuous ventilation at night is not beneficial in terms of the heat removed by such insulation via the opaque outer envelope elements; and (b) such insulation actually has a negative impact on building cooling.⁵⁶

5.3.2 *Window, roof and facade insulation*

The foregoing raises the question as to whether window, roof and facade insulation also allows for energy efficiency optimization in a manner that preserves an object's original structural fabric and is in keeping with heritage conservation good practice.

Let us first consider windows, which in the 1930s were realized with 3-4 mm thick glazing. The heat conductance coefficient of such glazing is around 6 W/m²K, whereas the figure for today's double glazing is around 1 W/m²K.⁵⁷ Heat transfer can be greatly reduced through the use of efficiently insulated window frames, combined with external shading elements. The choice of glazing in such cases is determined by window orientation and by shading, since protecting against solar radiation in the summer, achieving thermal insulation in the winter, and the desired solar heat gain all need to be weighed against each other. The impact of glazing on a building's outer appearance and historic appeal also needs to be factored into the equation.

One way to substantially increase comfort levels in heritage buildings is by reducing thermal input via opaque building elements, namely ceilings and outer walls. Composite thermal insulation systems can be used for this purpose. That said, none of the buildings that we viewed contained any thermal insulation at all. However, we were also told that Israeli standards in this area have been elaborated and are being applied.⁵⁸

In view of the fact that, like other countries, Israel is obligated to reduce carbon emissions, sustained energy efficiency measures in the form of building insulation will undoubtedly be implemented in Israel as well.

(56) Handler, S.; Korenjenic, A.; Bednar, T.: Einfluss von Wärmedämmverbundsystemen auf das Sommerverhalten von Gebäuden. *Bauphysik* 33,4 (2011), pp. 225-233

(57) As we noted during our stay in Tel Aviv, the current standard for rehabilitation is also the glazing standard.

(58) For example, Ministry of Environmental Protection: Israeli Standards SI 1045 establishes minimum requirements for thermal insulation of buildings that are used for extended overnight stays (apartment buildings, homes, hotels, guest houses, nursing homes, dormitories, prisons, hospitals, etc.). Meeting these requirements will ensure that a reasonable temperature is maintained in the building; thus the building will need less energy for heating and air conditioning purposes. http://www.sviva.gov.il/English/env_topics/GreenBuilding/Pages/GreenBuildingStandards.aspx (18.09.2014)



Figure 52: Facade soot particles (Tel Aviv, 2013)

Making buildings energy efficient is largely regarded in Central and Northern Europe today as indispensable, and also raises a number of heritage conservation issues. The following materials are currently used for building insulation: polymer foam; mineral-fibre products; and, increasingly, mineral insulation panels. Various insulation systems made of renewable materials are also available.

Inasmuch as it is the exterior appearance of heritage buildings that needs to be preserved, interior insulation could be used in Israel. If, in the past, such insulation was used solely for vapour impermeability purposes, it has been found that it often causes damage from moisture condensation on its inner surfaces. Moreover, walls, ceilings and windows are elements that are prone to deterioration and thus need to be factored into building planning.

Capillary-active insulation solutions such as mineral insulation panels, insulating plaster, and clay construction materials have come into increasing use in Germany of late, as an alternative. This type of insulation allows vapour molecules into the insulation level, in such a way that vapour

condenses upon reaching the condensate level (which normally is the inner boundary layer of heritage building masonry). Thanks to the capillary force of interior-insulation pore structures, condensate is absorbed inward and is discharged outward. Extensive research findings, in conjunction with numerical calculation methods such as WUFI⁵⁹ and DELPHIN,⁶⁰ have laid the groundwork for the development of construction materials and elements that promote heat and moisture retention, and have shown that such solutions function durably, when deployed in specific settings. WTA⁶¹ technical data sheets contain useful advisories in this regard.

Zirkelbach et al. carried out hygrothermic simulations of composite thermal insulation systems in various climate zones, in Dubai, Bangkok, Tokyo, Lisbon and Holzkirchen (Germany). These investigations showed that using such insulation systems in various climate zones can save a considerable amount of energy. The authors' calculations revealed that this type of insulation reduces heat flow through outer walls by up to 80%. The use of such systems comprising vapour-permeable mineral wool could potentially provoke corrosion and microbial growth, however.⁶²

(59) Software zur Berechnung des gekoppelten Wärme- und Feuchtetransports in Bau-teilen: Fraunhofer-Institut für Bauphysik IBP – Stuttgart

(60) Simulationsprogramm für den gekoppelten Wärme-, Luft-, Feuchte-, Schadstoff- und Salztransport: Institut für Bauklimatik, Fakultät Architektur – TU Dresden

(61) Wissenschaftlich-Technische Arbeitsgemeinschaft für Bauwerkserhaltung und Denkmalpflege, www.wta.de (27.05.2014)

(62) Zirkelbach, D., Künzel, H.M., Sedlbauer, K.: Einsatz von Wärmedämm-Verbundsystemen in anderen Klimazonen. *Bauphysik* 26 (2004), Heft 6, pp. 335–339.



Figure 53: Clean, white facade (Tel Aviv 2013)

In the interest of improving the energy efficiency of Tel Aviv's heritage buildings, extensive investigations are needed for purposes of analysing the impact, under local conditions, of improved thermal insulation on building-envelope elements, the goal being to:

- prevent moisture from accumulating in buildings;
- avert any increase in reinforcement corrosion in carbonated concrete elements;
- avoid – in structures that are retrofitted with insulation – microbial growth induced by unforeseen accumulations of moisture caused by building-physics related factors.

Another key factor that comes into play here is facade paint-colour selection. Light-coloured plasterwork absorbs less solar radiation than does dark plasterwork, since the absorption gradient of light-coloured surfaces is 0.3, whereas the figure for darker-coloured surfaces is 0.6.⁶³ This is why non-rehabilitated, weathered facades that are highly contaminated with dust and rust particles (Figure 53) absorb more solar radiation than clean light-coloured plastered surfaces (Figure 54). This means that

darker surfaces absorb approximately twice as much solar radiation, which is converted into heat and conducted into building elements. This phenomenon causes the facades and masonry of such dark-coloured objects to become hotter, and in the absence of insulation, the heat reaching the interior of building elements conducts more heat inward, thus driving up ambient temperatures in the building still further. For about a year now, the Stuttgart University Construction Materials Department has been conducting experiments on a weathering test stand. These investigations have shown that the noonday sun can raise the temperature on the surface of a white concrete slab to around 40 °C, and on a black slab to nearly 60 °C.

If composite thermal insulation is installed, calefaction of the thin plaster layer on the outside increases still further. Inasmuch as this calefaction creates potentially deforming stress on the surface, a sufficient amount of plaster reinforcement needs to be integrated in order to prevent cracks from forming.

(63) Marek, R.; Nitsche, K.: Praxis der Wärmeübertragung: Grundlagen-Anwendungen-Übungsaufgaben. – München 2012

5.3.3 Solar thermal energy, photovoltaic solar energy, and solar cooling

With around 3,200 hours of sunshine annually (see Figures 54 and 55) resulting in mean cumulative global radiation of around 2,250 kWh/(m² × a),⁶⁴ Israel has a tremendous amount of usable solar energy. Global radiation comprises the sum total of direct and diffuse radiation. In Germany, mean cumulative global amounts is

only around 1,055 kWh/(m² × a),⁶⁵ or half the amount in Israel.

In 2010, the European Renewable Energy Council (EREC) forecast that renewable energy could meet the entirety of European energy demand by 2050.⁶⁶ Around half of this electricity, the EREC said, would be provided by solar thermal energy and photovoltaic solar energy. According to current projections, there will be around two

(64) Deutsch-Israelische Industrie- und Handelskammer und Deutsche Energie-Agentur GmbH (dena); http://exportinitiative.dena.de/fachveranstaltungen/mausland/detailseite-terme/termin/event/20110410/tx_cal_phtmlendar/eschaeftsreise-nach-israel//list-138/?no_cache=1&cHash=19e7a60cb34f13bcd116a329a18084 (16.05.2014)

(65) Deutscher Wetterdienst; http://www.dwd.de/bvbw/generator/DWDWWW/Content/Oeffentlichkeit/KU/KU1/KU12/Klimagutachten/Solarenergie/Globalkarten__entgeltfrei/Jahressummen/2013,templateId=raw,property=publicationFile.pdf/2013.pdf (16.05.2014)

(66) Arthouros Zervos; Christine Lins, Josche Muth: RE-thinking 2050 – A 100 % Renewable Energy Vision for the European Union, European Renewable Energy Council (EREC), Brussels, April 2010 (<http://www.erec.org/media/publications/re-thinking-2050.html>) (18.09.2014)

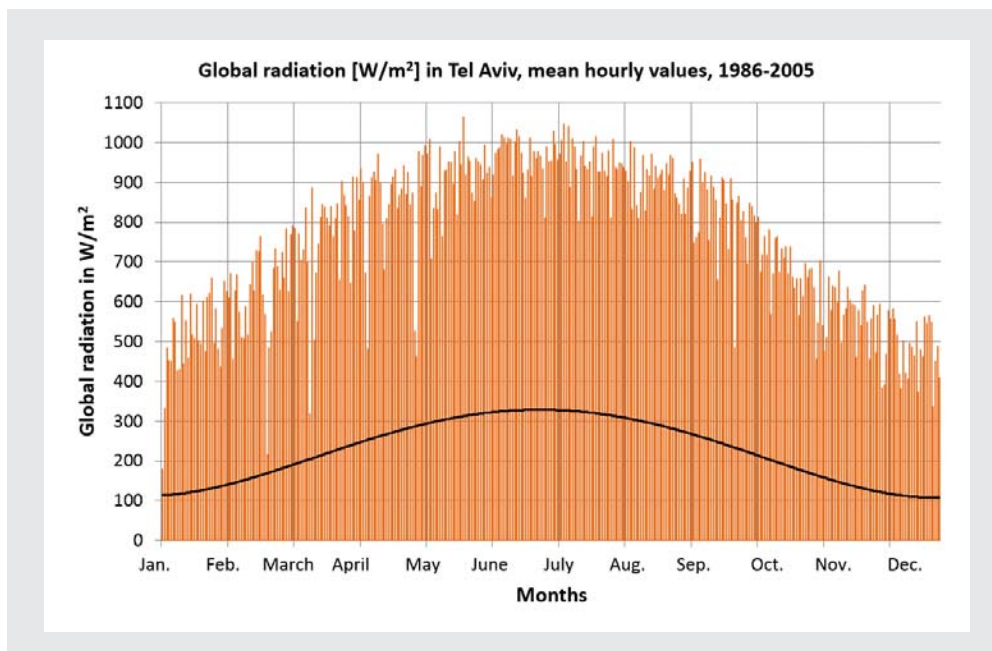


Figure 54: Mean hourly global radiation for 12 month periods in Tel Aviv, from 1986 to 2009

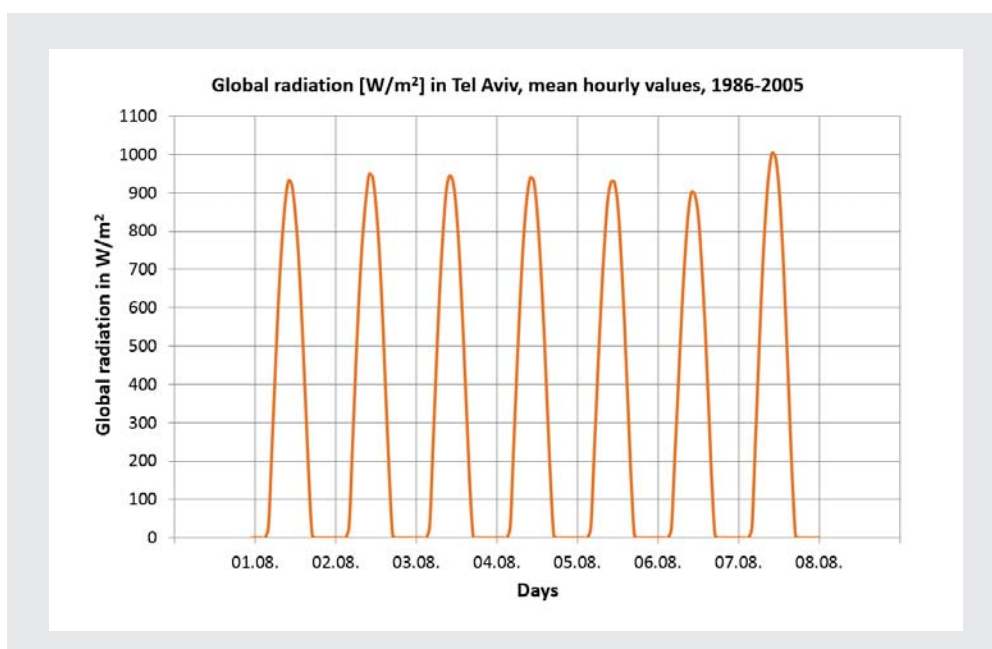


Figure 55: Mean hourly global radiation in the first week of August in Tel Aviv, from 1986 to 2009



Figure 56: Thermo-siphon installations on rooftops in downtown Tel Aviv (2013)

square meters of solar collectors per capita in Europe by 2020.⁶⁷

Solar thermal energy is already widely used in Israel. In Tel Aviv, for example, many hot water heaters are powered by thermo-siphon installations (see Figures 57 through 60). The use of solar installations with 10 square meters of solar collectors can save around 15 tons of carbon dioxide emissions over a ten year period.⁶⁸

Such installations are passive, i.e. they require no pumps. In a solar collector, cold water is heated by solar radiation, thus reducing the density of the water, which rises in the water circuit (water density 0.998 g/cm³ at 20 °C and 0.972 g/cm³ at 80 °C). This difference in temperature between tap water and solar-heated water translates into natural convection. When hot water is drawn from the system, cold tap water is added to it. On overcast days, water can

(67) Drück, H.: Solarthermie und Wärmespeicherung – Bausteine einer zukünftigen Wärme- und Kälteversorgung. – Stuttgart 2013

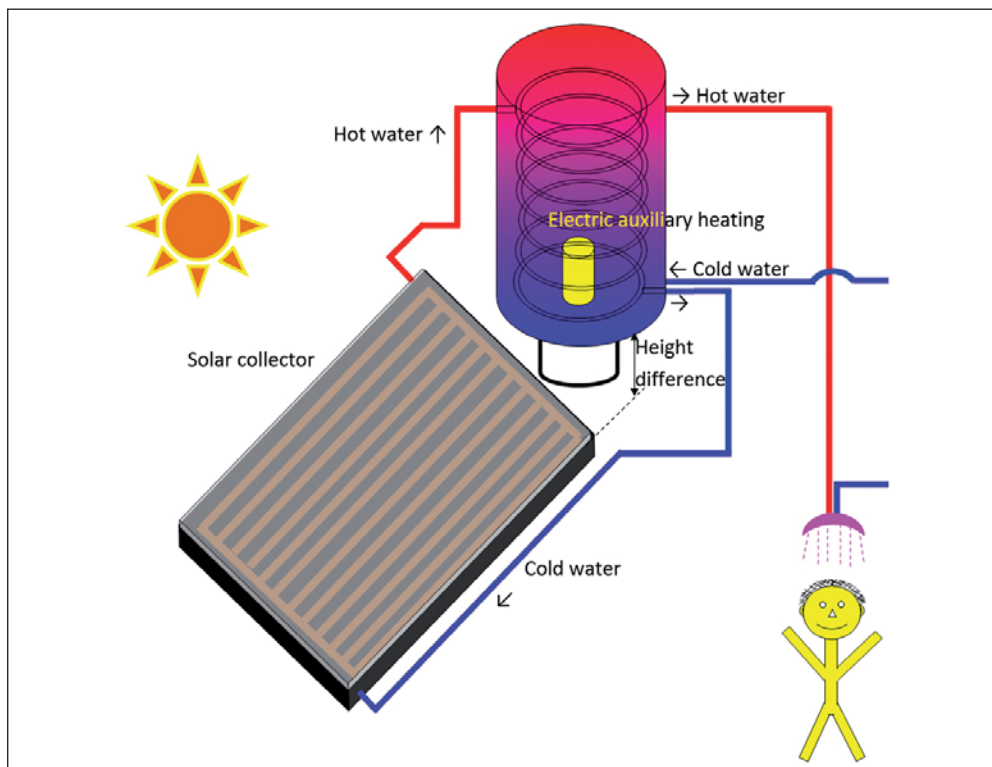
(68) Drück, H.: Solarthermie und Wärmespeicherung – Bausteine einer zukünftigen Wärme- und Kälteversorgung. – Stuttgart 2013



Figure 57: Thermo-siphon installation on the roof of a Tel Aviv apartment building (2013)



Figure 58: Thermo-siphon installation in Tel Aviv (2013)

Figure 59: Schematic of a thermo-siphon installation ⁶⁹

be heated up using an auxiliary electrical system, if necessary.

The use of solar thermal installations for hot water heaters and auxiliary heating is required by law in Israel, whereas the use of solar panels for electricity is not. This is probably due to the relatively low price of

electricity in Israel, i.e. only around €12 per kWh, compared to €26 in Germany. However, it would still make good economic sense for the use of photovoltaic solar energy to become more widespread in Israel, as such installations are extremely cost effective in places (such as Israel) that have abundant sunshine. If electricity

(69) Graphic by Christian Blatt

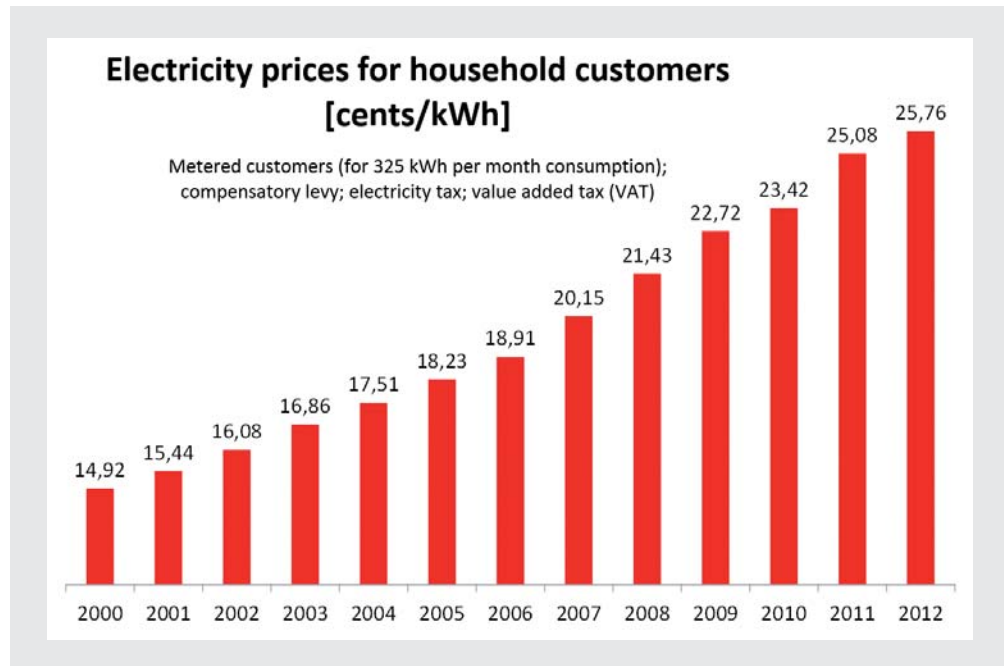


Figure 60: Electricity prices for household customers in Germany, 2000—2012 ⁷⁰

prices began rising in Israel toward the levels they have reached in Germany over the past decade or so (see Figure 60), photovoltaic solar installations would pay for themselves far more quickly than is the case in Germany, in light of the higher cost efficiency that would be achieved in (far sunnier) Israel.

According to a German-Israeli Chamber of Commerce and Industry report,⁷¹ in Israel electricity demand peaks between 11 a.m. and 5 p.m. in the summer and between 5 and 10 p.m. in the winter. The lowest demand at night is around 4000 MW and during the day around 10,000 MW. The high demand on summer days is mainly attributable to the use of air conditioners. The highest electricity demand in the history of Israel occurred in August 2010, when record high temperatures of 44 °C were recorded in Tel Aviv. Electricity demand during this period resulting from extensive use of air conditioners amounted to 11,530 MW.

In view of the extensive need to keep room temperatures comfortable in Israel, it would make sense to use alternatives to air conditioning such as solar cooling and heating installations. But unfortunately, there is little interest in such solutions owing to the fact that electricity in Israel is relatively inexpensive. However, irrespec-

tive of this factor, experimental demonstration facilities incorporating such alternative solutions could be realized in the White City.

To do this, further research into sustainable and energy efficient building cooling is needed that factors the special requirements of heritage protection into the equation. In view of the abundant sunshine in Israel, thermal and photovoltaic use of solar radiation should be increased, in the interest of energy security, as well as resource conservation for fossil fuels.

(70) Bundesministerium für Wirtschaft und Energie. Energiepreise und Energiekosten. <http://www.bmwi.de/DE/Themen/Energie/Energiedaten-und-analysen/Energiedaten/energiepreise-energiekosten.html> (03.05.2014)

(71) Deutsch-Israelische Industrie- und Handelskammer. Zielmarktanalyse ISRAEL – Energieeffizienz in der Industrie. http://www.inefficiency-from-germany.info/ENEFF/Redaktion/DE/Downloads/Publikationen/Zielmarktanalysen/marktanalyse_israel_2013_industrie.pdf?__blob=publicationFile&v=4 (03.05.2014)

6 Heritage conservation issues

6.1 A "White" City with coloured plaster

6.1.1 Plaster colouration

If the colour white has played a central role in architectural discourse in the early Modern Movement period, use of the term "white" has long since parted company with the actual colour of the buildings in question. The term "white" has become part and parcel of our take on Modernism, in that the colour "white" also "disciplines" surfaces, depths and materiality, and at the same time connotes uniformity and hygiene. Le Corbusier advocated the use of white enamel paint – although this is only one of many options.⁷² The varying takes people have on what constitutes a "white" building is borne out by architectural models, drawings, and above all highly artistic black and white photographs in exhibitions, on postcards and in books and magazines.



Figure 61: Postcard with camels, on Hayarkon Street; text on the reverse side: "Houses in Hayarkon Street, Tel Aviv (Yaakov Benor-Kalter), 1934 or later"



Figure 62: Contemporaneous photo of Rothschild Boulevard 117 in Tel Aviv (1933/34)

The stage was set for using "white" (in the expression "White City") to refer to Tel

Aviv's historical buildings in the 1930s and 1940s, by the photographs of Zoltan Kluger and in particular Itzhak Kalter and many others.



Figure 63: London Garden and beach promenade in Tel Aviv, designed by Avraham Karavan (photo: Zoltan Kluger, presumably from 1938)

The expression "White City" was probably first used by the poet Nathan Alterman – although an exhibition titled "White City, International Style Architecture in Israel, Portrait of an Era" is likely to have been instrumental in the expression taking hold.⁷³ But the term "White City" in most cases does not correspond to the reality of the actual buildings in question. That said, architects tended to have their buildings painted in a light coloured sun-reflecting colour, so as to prevent outer walls from becoming unnecessarily hot.



Figure 64: Apartment house with grey and blue plasterwork, corner of Allenby Street and Mazeh Street in Tel Aviv (2013)

When one looks at the actual colours of the buildings in the White City, this term appears to be wildly inaccurate. For in point of fact, the White City buildings are painted in a broad range of colours: various

(72) Stern, Ralf: Defining Shades: Weiße und moderne Architektur. In: Die Farbe Weiss. Farbenrausch und Farbverzicht. Hrsg.: Baus, Ursula. – Ulm 2003, pp. 70–83. Quote (p. 73) pertains to Ulm town hall.

(73) This Tel Aviv Museum exhibition from 1984 was modeled on the 1932 Barr, Russel and Johnson exhibition (Göckede, Regina: Adolf Rading (1888–1957): Exodus des Neuen Bauens und Überschreitungen des Exils. – Berlin 2005, p. 208



Figure 65: Plasterwork, Idelson Street, Tel Aviv (2013)

shades of white; sandy beige; ochre; red; and green. What also needs to be taken into consideration nowadays, however, is that all of these buildings exhibit a patina of aging, owing to accumulations of dust particles from the air.

Two aspects of 1930s construction practices are particularly noteworthy: Facade plaster was intended to, first and foremost, protect masonry from erosion. And secondly, architects and builders took advantage of the design options afforded by the

materials and methods that were used.⁷⁴ Lime hydrate was used as a binder for the mineral plaster of the period. This practice usually yielded light coloured, off-white plaster that ranged in colour from beige to greyish, depending on the type of lime used.

Another factor that influenced the colour of non-pigmented plaster was locally available sand. In Tel Aviv, the then common practice was followed of using local sand, resulting in plaster that was light beige in

(74) Lade, Karl; Winkler, Adolf: Putz Stuck. – Stuttgart 1952, p. 96.



Figure 66: Apartment building, corner of Allenby Street and Moshe Hess Street, Tel Aviv (2013)



Figure 67: Apartment building (presumably from the 1940s) with characteristic plasterwork, and balcony slats; Gordon Street, Tel Aviv (2013)

colour. However, judging from the way the objects in question look now, minute amounts of varying shades of inexpensive iron oxide pigments were probably added to the plaster. This plaster was applied using techniques that the settlers had brought with them and that were very widely used in Europe. Traces of the use of intensely reddish and greenish plaster can still be seen on certain buildings in Tel Aviv.

The colouration of exterior plaster was largely determined by cost considerations – and thus was solely determined by the materials used. Only rarely was the colour of these materials varied by adding pigments.

Lab tests would be needed in order to prove with certainty that, unlike the practice today, new plaster was not painted immediately after being applied. Doing so would have made no sense in Israel owing to its low rainfall; nor would this practice



Figure 68: Here, the original reddish brown plaster is visible in places where the paint is flaking off; environs of Bellinson Street and Frug Street, Tel Aviv (2013)



Figure 69: Beige plasterwork that has been partly painted over in white, Dizengoff Street, Tel Aviv (2013)

have been in keeping with attitudes back then toward the aesthetics of external plasterwork, or the limited financial resources that were available at the time. Lime coatings, when used, were applied to fresh plaster.

Coatings in varying shades, particularly in extreme white tones (achieved using synthetic and highly effective white pigments such as titania) correspond to what we are accustomed to seeing nowadays. Extreme care needs to be exercised in dealing with historic plasterwork. Using very light coloured white coating materials for all White City buildings would create a new ahistorical reality in Tel Aviv's White City. Such untoward tendencies can only be nipped in the bud if the Tel Aviv Conservation Team makes concerted efforts to raise

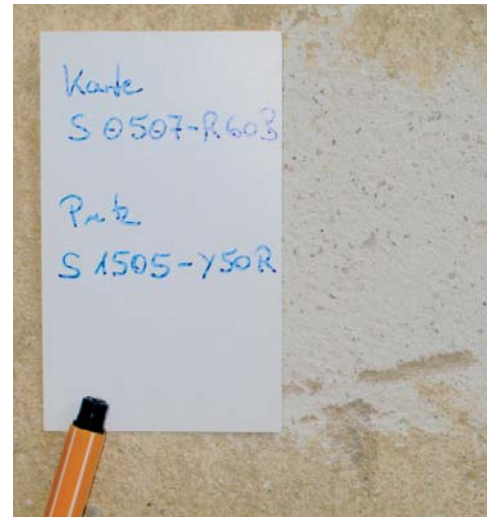


Figure 70: Measuring the colour (using an NCS colour scanner) of the plaster on the rear of the building at Rothschild Boulevard 117, Tel Aviv (2013)

awareness among owners and lays down specific regulations.

At the Bauhaussiedlung Dessau-Törten apartment complex, the relevant stakeholders have learned from such mistakes, albeit in a different context. In 1994, heritage conservation rules were laid down for this apartment complex calling for restoration of the earlier sentimental "Germanic" facades from the 1940s through the 1980s, the goal being to approximate the original facade segmentation. However, the envisaged changes in this segmentation were a poor compromise between the original design and the conversion that was actually carried out. For in point of fact, the 1994 conservation rules added a third level of reality – which despite good intentions, created something false. This experience resulted in revision of these rules in 2014. This example shows that when it comes to setting rules for historically accurate rehabilitation, the envisaged measures can be based on the state of the original building and the relevant findings.

6.1.2 Plasterwork

First, it should be noted that Tel Aviv's buildings exhibit myriad types of plasterwork that are in very close proximity to each other. This constitutes a unique ensemble of architectural approaches to facade plasterwork, a great many of whose characteristic decoration variants from the 1930s⁷⁵ have been preserved.

(75) Lade and Winkler's encyclopedic textbooks describe the commonly used plasterwork techniques that were also extensively used in the 1950s. It was not until later that these techniques were gradually replaced by simplified techniques involving the use of industrial plasters that were machine-applicable.



Figure 71: Pigmented reibeputz plasterwork, Gordon Street, Tel Aviv (2013)

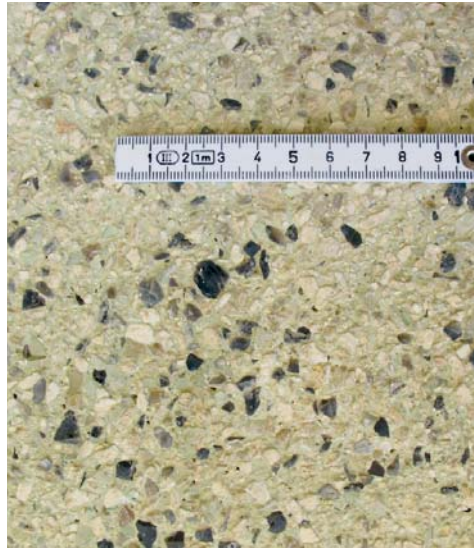


Figure 72: Plasterwork with aggregates in various colours (Tel Aviv, 2013)

During this period, as had been the practice for centuries,⁷⁶ plaster was mixed at the work site (economic circumstances permitting) and was decoratively applied using extremely simple means. This mainly involved the application technique – but also adding pigments to the plaster.⁷⁷ Traditional application techniques were used with consummate expertise. Numerous German loan words in Hebrew such as *kratzputz* and *waschputz* bear testimony to the appropriation of common German plastering techniques.

As in many other countries, in Israel the myriad traditional plaster application and pigmentation techniques that were once so common have largely died out. The advent of commercial plaster in the construction industry has caused (and is continuing to cause) the traditional craft of making up and applying plaster to die out. Only three decades ago, there were still many plasterers in Germany (and presumably in Israel as well) who knew how to mix plaster properly on site and apply it with consummate expertise. Today, this craft has largely died out. This represents an enormous worldwide cultural loss (which nonetheless has largely gone unnoticed), because these techniques were of paramount importance for facade design and construction. They also allowed plasterwork to be repaired with relative ease.

But there is hope in this regard for heritage conservation in Europe, as a group of ex-

perts and interested parties has been formed that is testing the formulas and techniques that have fallen into disuse.⁷⁸ If this will not result in a revival of the richly varied craftsmanship of bygone days, it may at least allow historical buildings to be restored and repaired using historically authentic materials and techniques. Hence the abundance of historic plasterwork in Tel Aviv (outdoor archive) constitutes an excellent resource for the training of European, German and Israeli experts. This resource could very likely form the basis for international German-Israeli cooperation aimed at preserving plasterwork from the 1930s. Both sides would benefit from close cooperation in this regard. Training courses in historic plasterwork techniques would benefit greatly from a construction archive



Figure 73: Decorated facade plasterwork (Tel Aviv 2013)

(76) Gasch, Hans Albrecht; Glaser, Gerhard: *Historische Putze, Materialien und Technologien*. – Dresden, 2011, pp. 26–37 and 41–76.

(77) Maier, Josef: *Putz und Stuck, Materialien – Anwendungstechniken – Restaurierung*. – Fraunhofer IRB 2007, pp. 36–38.

(78) Also see: Danzl, Thomas: *Beton-Polychromie? Von Mausgrau bis Kunterbunt*. In: *Denk-mal an Beton. Material, Technologie, Denkmalpflege, Restaurierung*. Hrsg.: Vereinigung der Landesdenkmalpfleger. – Petersberg 2008, pp. 104–114



Figure 74: Heterogeneous block comprising various materials, surfaces and colours; Jehuda Halevi Street, Tel Aviv (2013)

in the envisaged White City visitor and heritage conservation centre (see section 7.4.1)

6.2 Structural and architectural elements

When German visitors, restorers, heritage conservators and construction researchers first see Tel Aviv buildings, they are amazed at how familiar these objects are, because many of their salient details are exactly the same as those found in German buildings. Even brief visits to Tel Aviv apartment buildings reveal that their surfaces, structural and architectural elements, and terrazzo flooring are identical to many German apartment buildings of this period.

This phenomenon is attributable to the now largely forgotten Haavara Agreement, which was concluded in 1933 between the Jewish Agency, the Zionist Federation of Germany and the Nazi Ministry of the Economy – the shared Nazi regime and Zionist goal being to facilitate the emigration of affluent German Jews to Palestine.

Moreover, by signing this treaty, the Nazi regime also hoped to alleviate the economic crisis and counter the feared Jewish trade boycott.⁷⁹ The agreement was drawn up by a fiduciary company founded for this specific purpose. Before emigrating, German Jewish emigrants deposited all of their assets in this transfer company, which used these funds to purchase (fully taxable) materials, goods, machines and the like from German companies.

Thus German emigrants, construction materials dealers, architects, property owners or contractors who wanted to purchase materials in Palestine in the 1930s (which saw a construction boom in the White City) had no choice but to purchase sophisticated German products and construction materials through Haavara.⁸⁰ For the White City-Tel Aviv cooperation network, this opens up a separate historical dimension in terms of the importance of a construction archive in Tel Aviv. Scientists, heritage conservators, and construction industry professionals in both Israel and Germany could greatly benefit from such a resource.

(79) Weiss, Yfaat: The Transfer Agreement and the Boycott Movement: A Jewish Dilemma on the Eve of the Holocaust. *Yad Vashem Studies* 26 (1998), pp. 129–172. Translated by Naftali Greenwood. http://www.yadvashem.org/odot_.pdf/Microsoft%20Word%20-%203231.pdf (11.02.2014).

(80) The Haavara Treaty with the Nazi regime was subject to the condition that Jews who had had enough of and were driven to despair by Nazi antisemitism, and who were willing to emigrate to Palestine, would do so. On the other hand, the assets of Jews who emigrated elsewhere were frozen. The socio-historical dimensions of the treaty and its repercussions lie beyond the scope of this report. Also see: Segev, Tom: *Die Siebte Million – Der Holocaust und Israels Politik der Erinnerung*. – Hamburg 1995; Black, Edwin: *The Transfer Agreement*. – New York 1984.



Figure 75: Terrazzo flooring in the living room of a fourth floor apartment at Mazeh Street 31 in Tel Aviv (2013)

Many of the innovative construction materials and technical elements that were described in the German professional journals of the time were undoubtedly exported to Palestine and incorporated into buildings there. Owing to deficient conservation of Tel Aviv buildings, many of their structural and architectural elements are in poor condition – although they have been preserved nonetheless.

In Germany, on the other hand, due to the fact that the prevailing (and unfavourable) climatic conditions can cause problems such as mould, corrosion and the like,



Figure 76: "Thermometer" windows with steel frames and movable panels; Tel Aviv (2013)

many surfaces and structural elements are replaced during renovation projects. But at the same time, German cultural attitudes such as an obsession with perfection and a strong desire to renovate (while maintaining the same level of affluence) results in the replacement of preserved historic building elements and in pretentious modernization measures.

6.2.1 Wood-frame windows

During our visits, in October 2013, to three Tel Aviv heritage buildings that were being renovated, we observed that all windows and doors had been replaced – ostensibly to meet tighter acoustic insulation standards.

Unfortunately, such replacement is common practice in both Germany and Israel – although in Germany it is being increasingly called into question in light of a growing awareness of the importance of resource conservation and of monument conservation. For if greater attention is paid to the actual situation, and if heritage rehabilitation projects are carried out in an historically accurate fashion, it turns out that there are ways to retain the existing windows in such cases. For example, by replacing window panes and installing seals, the building-physics attributes of an object can be greatly enhanced. Such conservation is all to the good, because, by virtue of their thinner frame profiles, such windows normally are more suitable for heritage buildings than is the case with modern windows. For window conserva-



Figure 77: Wood frame windows at the side entrance to Rothschild Boulevard 117 in Tel Aviv (2013)

tion is crucial when it comes to preserving the facades of buildings, since windows are a central element of a building's appearance.

6.2.2 Terrazzo terraces

We were struck, during our visit, by how many Tel Aviv apartment buildings have terrazzo floors and staircases. This material is altogether suitable, not only by virtue of its durability (in terms of wear and tear, and termites), but also owing to its excellent thermal conductance and the consequent cooling properties – making it ideal for a hot climate. The terrazzo flooring on staircases made of prefabricated elements in Tel Aviv buildings occurs in an extremely broad range of colours, and in some cases, in extremely elaborate forms. In many cases, the terrazzo elements were laid in conjunction with subsequently mixed flooring with granularity and colouring exactly matching that of the terrazzo elements – testimony to close collaboration, back then, between industrial manufacturers and dedicated craftsmen (see section 9).

Preserving the many different terrazzo designs and patterns, many of which are



Figure 78: Newly installed shutters in a heritage building (from around 1920) under renovation; Derech Jaffa Street 13, Tel Aviv (2013)

magnificently precise, is key when it comes to preserving the authentic architectural elements of heritage buildings.

6.2.3 Steel frame windows

The structural elements of facades and windows of Tel Aviv buildings are often made of steel. Particularly striking in this regard are the myriad "thermometer" windows in staircases. But unfortunately,

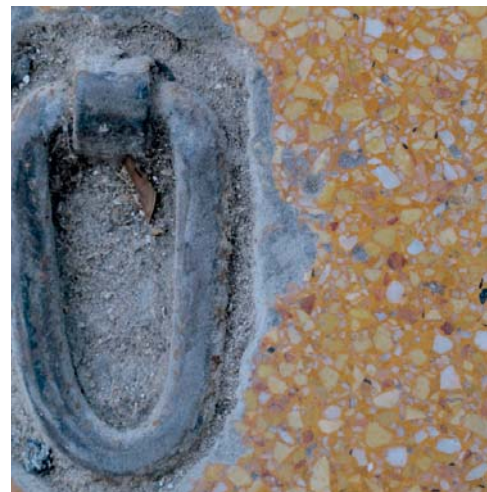


Figure 79: Detail of a terrazzo floor in a building on Montefiore Street in Tel Aviv (2013)

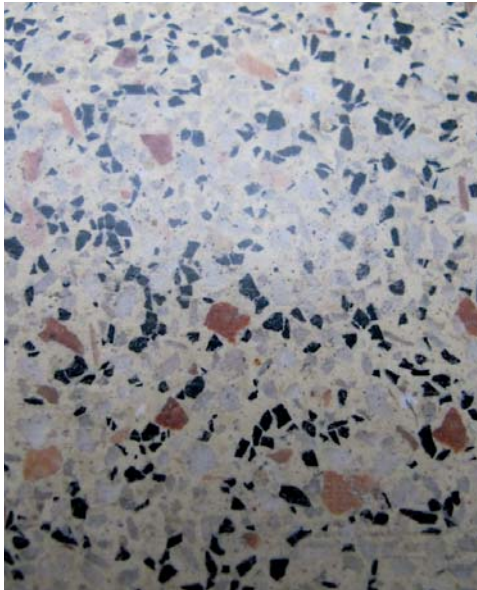


Figure 80: Staircase with terrazzo cast steps and added coloured stone aggregates; Aharonovitch Street 30, Tel Aviv (2013)

many of these windows were not endowed with adequate rust protection (as is often the case in Europe as well). As a result of this, in conjunction with inadequate building maintenance, some of these window frames are extremely corroded – in many cases so severely that major portions of the frames have eroded away. Although corrosion occurs on the surface and infiltrates under the paint, the largely dry and

warm air still protects the surfaces from being eaten away very quickly.

Tel Aviv's climate makes steel frame windows suitable for the city's buildings, even for windows that are not thermally decoupled, as is done in northern countries for energy saving purposes. Hence preserving these windows is well within the realm of possibility, and should be taken into consideration when heritage buildings are re-



Figure 81: Elaborate terrazzo floor and stone cladding in the entrance lobby of a house, nearby Aharonovitch Street 30 in Tel Aviv (2013)



Figure 82: Elaborate steel frame windows, in a checkerboard pattern, in a staircase at Pinsker Street 23 in Tel Aviv (2013)



Figure 83: Interior view of staircase at Pinsker Street 23 in Tel Aviv (2013)



Figure 84: Fully preserved steel frame glass door (store entrance), Allenby Street 52, Tel Aviv (2013)

habilitated. It would of course make perfect sense, in such cases, to replace the original glazing with today's thermal glazing, so as to reduce heat conductance into apartments.

6.2.4 Reinforcement corrosion; upgrading concrete elements

A great many Tel Aviv buildings have balconies and concrete elements that are in extremely poor condition. This is usually attributable to faulty construction practices – of which builders were, however, unaware in the past. Reinforced concrete exhibits characteristic signs of aging if the concrete cladding on rebars is inadequate. Rusting of the rebars increases their size – and this in turn causes the concrete and plaster cladding to split open.

The following conditions promote corrosion formation:

- Rebars close to the surface of the concrete.
- Passivation counteracted through extensive concrete carbonatation
- Adequate moisture in the environs of the reinforcing steel.

Figures 85 through 88 show reinforcement corrosion, whose repair needs to be overseen by planners who have the requisite expertise, as well as by support-structure



Figure 85: Pergola reinforcement corrosion (Tel Aviv 2013)



Figure 86: Detail of Figure 85.

planners. The repair strategies adopted should ensure that the building is preserved and that good-practice heritage conservation is effected.

Inasmuch as Tel Aviv has very little precipitation, and temperatures seldom drop below the dew point, and the relative humidity tends to be low (see Figures 89 and 90), deterioration is less severe than would have been the case in Germany's climate.

On the other hand, Tel Aviv's salt air results in chloride loads in concrete and is partly responsible for severe deterioration.⁸¹

In the interest of developing approaches to concrete-element rehabilitation that allow for historically accurate heritage conservation, extensive investigations of the relevant buildings should be carried out, and repair measures should be tested using so called pilot building sites.

In order for concrete rehabilitation to be consistent with historically accurate heritage conservation, the attendant measures need to carefully take into consideration the outward appearance of, and the materials used for, the surfaces of historic buildings. Hence the deterioration that has been incurred by such buildings and the materials that come into play need to be carefully investigated. In order to carry out the envisaged measures in a manner that is compatible with the object in question, the following parameters should be investigated at a minimum:

- The extent of the deterioration that has been incurred by, and the condition of, reinforcement elements
- Status of concrete carbonatation
- Matrix homogeneity and matrix-aggregate bonds

(81) Based on DIN EN ISO 12944-2, objects located in the White City coastal area fall into class C 4.



Figure 87: Balcony reinforcement corrosion (Tel Aviv 2013)



Figure 88: Detail of Figure 87.

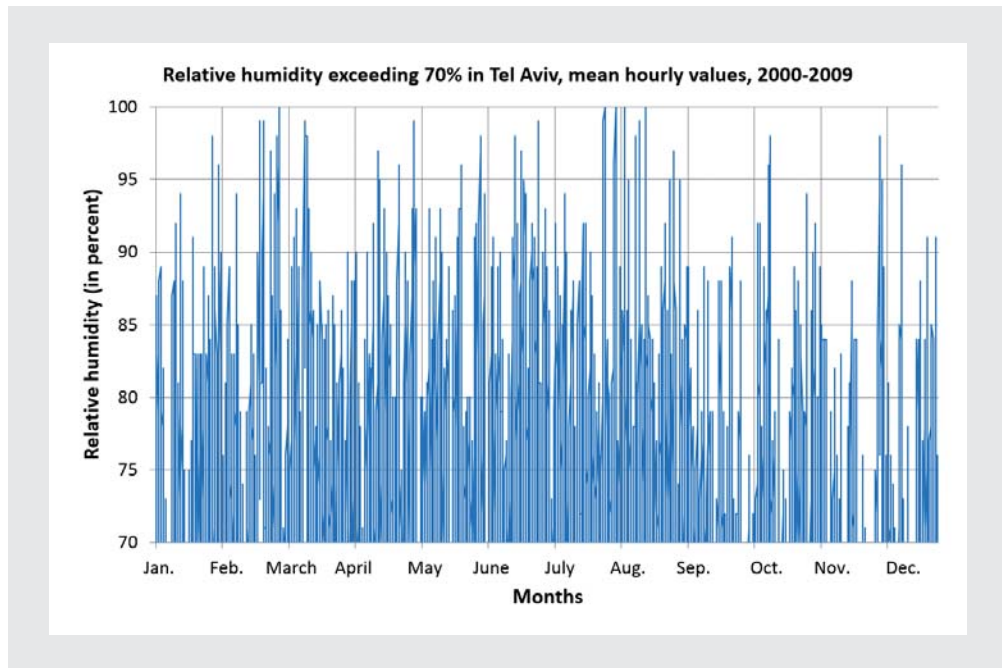


Figure 89: Mean hourly relative humidity exceeding 70% in Tel Aviv, from 2000 to 2009

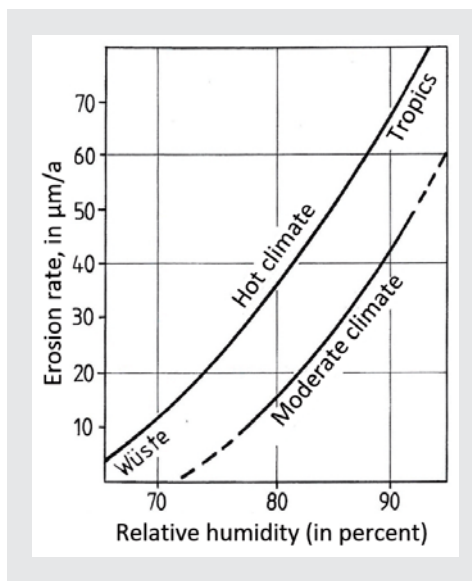


Figure 90: Erosion rate for corrosion, relative to temperature and relative humidity⁸² in a moderate and hot climate

- Proportions of aggregate/binder mixtures; mix design and aggregate granularity distribution
- Water-cement values
- Sand and aggregate quality
- Particle size
- Pore size, air void content (density properties)

- Historical object concrete (fatigue strength, water absorption, raw density)
- Composition, determined via optical microcopy, REM and thin/surface layers)
- Cement content
- Cement type; additive distribution (in percent)

Status of historical object concrete:

- Cement hydration
- Overall deterioration; surface binder elution of cracking systems (micro-cracking)

- Course and depth of carbonation

Additive formulas:

- Information concerning the formulas of mortar used for repairs.
- Determination of physical and mechanical parameters
- Bonding agent; crack sealing material

For local repairs of damaged areas on building elements with a cement coating, a formula that is compatible with the heritage object should be used. In addition, the colour and structural properties of the

binder and additives should be determined, based on the results of the aforementioned investigations.

For plastered and coated building elements, premixed commercial products can be used for local repairs, provided that such materials create a permanent bond with the substrate. The leading European manufactures of such products are Sika, MC Bauchemie, Sakret and Remmers.

That said, only those measures and products should be considered for possible use that reliably forestall further reinforcement corrosion and that create a permanent bond between the repair material and the historical object's concrete. Very useful information in this regard is available from the German repair guidelines titled *Schutz und Instandsetzung von Betonbauteilen*, which were issued by *Deutscher Ausschuss für Stahlbeton e.V.* (English translations of the relevant DIN EN 1504 can be downloaded under *Beuth.de* or *SIKA.ch*.) It would also in this regard be advantageous, within the framework of collaborative research (e.g. between Israeli and German academics), to formulate questions concerning suitable repair strategies and their sustainability.

6.3 Individual repairs versus complete rehabilitation

Tel Aviv is an extremely vibrant city that many people find appealing and that has attracted numerous new residents ever since its founding. This has resulted in a housing shortage that has driven up rents astronomically. The city's renters include a group of predominantly young urban professionals with good incomes who are able and willing to afford relatively small apartments, albeit with great difficulty. This is a phenomenon that simply does not exist in Germany. The housing shortage in Tel Aviv and the consequent changes in the city's buildings pose a threat to Sir Patrick Geddes's original urban plan.⁸³ It is noteworthy that as early as 1935, the architect M.H.A. Pataki noted that Tel Aviv's population density was unduly high (see the quote from him in section 3.1).

The housing shortage in Tel Aviv has resulted in the construction of large new high-rise districts in the suburbs of Tel Aviv.

Such high-rises are found within the city limits as well, however, and whole neighbourhoods have been torn down to make room for them. This evolution gives rise to the question as to how the historical buildings from the 1930s should be dealt with. There are, in our view, two possible approaches: (1) Top to bottom renovation, which would involve making major changes in these buildings. Such renovation is normally carried out by investors and large building contractors. (2) The relatively infrequently applied incremental approach, whereby private individuals hire smaller building contractors to carry out renovations in their building, one small step at a time.

A major obstacle to the incremental approach is the fact that Tel Aviv apartment houses usually have more than 12 owners, many of whom live abroad. Such owners have little or no contact with or knowledge of their property, and thus are unlikely to be very interested in investing in upkeep of these properties, as long as they derive income from them.

Against the backdrop of the unusual political and security situation in Israel, the housing shortage in Tel Aviv and the fact (as noted) that the city's apartment buildings usually have 12 owners has resulted in a situation where the White City's listed buildings are not being properly maintained, and rehabilitation is long overdue. In the minds of many Israelis, the need for continuous maintenance of historical buildings pales in significance in light of the

(83) In late 2012 Tel Aviv added to National Master Plan 38 a program that allows two and a half floors (which must also be earthquake-proof) to be added to each residential building. "The plan will breathe new life into property development and investment in the city [...] the investment opportunities for Tel Aviv would be immense [...] There is also call for demolition in the White City of structures not under conservation to make room for new high-rise residential buildings." *Disson, Sian: Legislation alterations to enable developers to increase building heights in Tel Aviv* (12 November 2012); <http://www.worldarchitecturenews.com/index> (25 February 2014)



Figure 91: Status of ongoing renovation at Sderot Hen Street 38 in Tel Aviv, in October 2013



Figure 92: Construction site sign concerning a planned expansion involving adding two floors and substantially increasing object cubage (also see Figure 91); at Sderot Hen Street 38 in Tel Aviv (2013)

constant threat to their security that they feel they are living under. Relative to the White City, this phenomenon is even more pronounced in the area between Tel Aviv and Jaffa's old city (e.g. in the environs of the old bus station), which to some extent has been damaged by rockets and constitutes an area where rehabilitation is being neglected.

Tel Aviv is attempting to implement policies involving financing and subsidy programs that will counteract this tendency. These policies aim to persuade the owners of listed buildings to invest in maintaining and expanding them, but in a manner that is compatible with historically accurate heritage conservation.

The city maintains a 12-member Conservation Team in charge of overseeing historically accurate heritage conservation of the listed buildings in the White City. Although the Conservation Team is undoubtedly understaffed, individual renovation projects are carried out by this experienced team of architects in a dedicated fashion. Experienced desk officers oversee the various construction sites on site, and provide owners and contractors with advice, as needed.

Because Tel Aviv's Conservation Team is understaffed, general rehabilitation takes precedence over minor building maintenance measures. This ensures that the measures carried out by the companies with the requisite experience, the necessary historically accurate conservation practices will be implemented.



Figure 93: Apartment house with eclectic-style architecture (located within the confines of the UNESCO common buffer zone) at the corner of Lilienblum Street and Yehouda Ta Halm Street in Tel Aviv (2013)



Figure 94: An apartment house being renovated while occupied (balcony enclosures being removed); MazeH Street 31 in Tel Aviv (2013). (The owner is considering installing an elevator.)

In Tel Aviv, complete rehabilitation involves not only renovating a building in the usual sense of the term, but also making major changes in its foundation and to added floors. Oftentimes the entire building is separated from its foundation so as to allow for the construction of one or two additional basement levels. Then, once the statics have been rendered suitable, up to three floors are added to the top of the building, so as to create new rental apartments.

Establishing such construction sites, and the attendant excavation, storing of extremely heavy construction materials, and the use of huge pieces of construction equipment inevitably results in major structural-fabric loss, as well as the loss of outdoor appurtenances that were part of the original building – namely paths, garden walls and bed borders – as well as trees and front yards that extend far underneath the building.

Owing to the requirements imposed by the Conservation Team, in projects involving top to bottom renovation great importance is placed on re-constructing the building to its primary state and preserving the authentic appearance of its historic facades. To this end, balcony enclosures are removed,⁸⁴ exterior air conditioners are re-installed in a manner that conceals them from view, exterior window shades are re-

built or repaired, and plasterwork is restored, insofar as possible. Building corridors, as well as staircases and their “thermometer” windows, are also included in the project – but not the interiors of the various apartments.

It was repeatedly brought home to us by members of the building inspection authority and by heritage conservators that one of the main obstacles to carrying out listed-building rehabilitation projects is the



Figure 95: A construction site being operated in an exemplary manner. The extensive measures being carried out will nonetheless result in the loss of substantial portions of the building’s structural fabric and of outdoor appurtenances (Sderot Hen Street 38 [Tel Aviv, 2013])

(84) Enclosing the balconies added living space to the apartments in question.



Figure 96: Large construction site, Hen Street, Tel Aviv (2013)

lack of training infrastructures for members of the building trades. As a result, only day labourers are hired in most cases, some of whom have the requisite experience, but none of whom have been properly trained for their appointed tasks. This lack of training infrastructures means that by and large, it is simply not possible to guarantee professional project implementation. This is particularly noticeable at historical-building construction sites, which should be staffed by well trained teams whose members have the requisite training in and experience with historical construction techniques. Thus for example, only a handful of Tel Aviv contractors who have older employees has the wherewithal to realize kratzputz plasterwork or perform other historical techniques.

(85) Pilotis are piers that support buildings; the term was coined by Le Corbusier.

(86) For example, EN 16096:2012 (see section 3)

(87) Micha Gross: PowerPoint presentation at Bauhaus centre, Tel Aviv, "Erhaltung, Abriss, Aufstockung: Die Zukunft des Bauhaus-Erbes in Tel Aviv", slide 23. See note about this title in the bibliography.



Figure 97: Supported pilotis⁸⁵ (pier) under construction between new pillars (view from the new basement) at Sderot Hen Street 38 in Tel Aviv (2013)

Our Israeli informants also told us that Israel lacks qualified restorers. Hence there is a shortage of qualified individuals not only for rehabilitation projects, but also for condition surveys, concept development, and documentation prior to execution of the project in question (in accordance with European standards⁸⁶) that are indispensable in the lead-up to any such project. This in turn means that international standard building restoration and oversight methods cannot be used – and unnecessarily large amounts of historical structural fabric and the surfaces and the architectural details thereof are lost. These problems are compounded by negligent construction site supervision.

The Conservation Team officials are also aware of this lack of qualified personnel, in that, by virtue of their own experience and the colleagues they have contact with in Israel and abroad, they are familiar with the manner in which historical building renovation is carried out in other countries. In the final analysis – and as was confirmed by our numerous conversations with Israeli architects who work on renovation projects for listed buildings in Tel Aviv, as well as representatives of Tel Aviv's Conservation Team – the shortage of qualified personnel is a structural problem, attributable to Israeli job qualification laws. Local heritage conservators cannot solve this problem on their own, through measures such as introducing a two-track training program for members of the building trades, or establishing a restoration training program.

If conservation professionals are calling into question the condition of historic buildings in general, according to members of the Conservation Team there has nonetheless been considerable improvement in the overall appearance of the White City. Indeed, the White City has been accused of exhibiting a "slum-like structural fabric."⁸⁷ It should be noted in this



Figure 98: Mail boxes, Idelson Street 14 in Tel Aviv (2013)



Figure 99: Detail views of steel enclosure elements for building grounds: at left, front yard at Idelson Street 14 in Tel Aviv, (2013); at right, front yard at Nürnberger Str. 3/Danzigerstraße in Karlsruhe Dammerstock (2014). Both enclosures have the same type of serrated upper element.

regard that rehabilitation projects being long overdue does not necessarily mean that a particular cityscape as a whole is being neglected.

By the same token, advocating heritage conservation cannot possibly, in and of itself, bring about a change in our society's current mindset, whereby maximum profits are sought through rental income following extensive general rehabilitation measures and subsequent continuous building upkeep.

We strongly recommend that in the future, restorers who are already working at a high level in Israeli museums be involved in the interest of achieving historically accurate conservation and for collaboration with architects who are tasked with rehabilitation. We were struck by the fact that Tel Aviv apparently has no mechanism for the maintenance of apartment house community property. As Israeli apartment houses do not have building managers (as we do in Germany), no funds are set aside for building upkeep and maintenance by condo owners in the residential areas in question. In our view, a new mindset is needed here.

Moreover, in some quarters carrying out rehabilitation in small steps for modernist buildings is frowned upon. For example, Nahoum Cohen lamented, over a decade ago, the fact that Tel Aviv was built during times of armed conflict and that the city suffers from its unstable inland area. According to Cohen, quality standards were lower for buildings constructed after the war. He states as follows:

*"And the renovation of Bauhaus buildings tends to be problematic. Some were badly built, with cheap materials. Mistakes in detailing occur frequently. Architects are obliged to invent better detailing, but it has to look like it could have been made 50 years ago. The biggest problems occur because the wrong stuccoes were frequently used. Here, specialist firms, many from Italy, are brought in. Even so poor external-wall construction can prevent proper durable solutions. Also detrimental to the appearance of the city is the effect of piecemeal renovation – but Tel Aviv is by no means the only example of that."*⁸⁸

Apparently, in Tel Aviv a repair⁸⁹ is in and of itself regarded as a measure that does not go far enough or that is even disfiguring. Cohen is not the only expert who holds this view: various Israeli experts told us the same thing during our stay in Tel Aviv. Here, we take a completely different view, in that we feel that repairs are altogether compatible with historically accurate heritage conservation.

6.3.1 Adding floors to and building additions on to listed objects in Germany

In Germany, it is prohibited to make substantial changes in listed objects without permission from conservation authorities. In other words, any envisaged rehabilitation, renovation, or restoration project is subject to prior approval from the authorizing body. Nonetheless, there are many examples in Germany of additions being built on to, and floors being added to, listed objects. For example, the top floors of

(88) Cohen, Nahoum: Tel Aviv. An Architectural Guide. – London 2003, p. 15.

(89) "Actions applied to an object or part of it to recover its functionality and/or its appearance" (EN 15898:2011, 3.5.10).

modernist buildings in Berlin's financial district were enlarged – although some of these changes are attributable to changes (which were subsequently reversed) in order to repair World War II bombing damage, or to changes made under the East German regime. These imposing buildings are also listed as heritage buildings that are part of ensembles.⁹⁰ Another example (this one in an exposed urban development setting) is the floors that were added to Behrenstraße 42-45 (corner of Charlottenstraße), which has always been a public buildings. This Ludwig Heim building from 1900 was enlarged from 1909-1912, and one floor was added from 1921-1925. The architects that were tasked to convert the building to the "Humboldt-Carré" were later permitted to add two glass-enclosed staggered floors to the building, in 2009, notwithstanding the building's status as part of a protected ensemble. However, in both of these cases the new (upper) floors are clearly delineated from the old (lower) ones, and even unschooled observers can readily distinguish between them.

6.3.2 Adding floors to and building additions on to listed objects in Tel Aviv

In light of the pressing need for new housing in Tel Aviv, the city decided to allow

floors to be added to all of the city's heritage buildings, except for those under a high grade of listing. This regulation also applies to the three UNESCO White City core zones. From the standpoint of German heritage conservation practice, fundamental change in the urban space conceived by Sir Patrick Geddes is highly questionable.

Any change in an existing building entails the addition of a new historical layer – which is not necessarily a bad thing. In the early years of the White City as well, floors were added to buildings and buildings were modified in order to create new housing to accommodate the growing number of immigrants to Palestine. This also entailed parting ways with the tenets of Geddes's urban master plan, in that the original height limits were exceeded soon under new regulations that were adopted by Tel Aviv's urban planning department, which was headed by Yacov Shiffman.

That said, seeing a building through the lens of heritage conservation is a completely different matter, for the central concern is preserving the existing building as an historical artefact – which primarily entails preserving the building's heritage attributes. The urban ensemble of Tel Aviv in and of itself is what comes into play here – not individual houses or apartment buildings. It was on the strength of this exceptional universal value that the White City was classified as a UNESCO World Heritage Site, and was subsequently placed under protection by the city of Tel Aviv.

It is for the following reasons that Germans take a dim view of the practice, in Tel Aviv (which is allowed by law), of adding floors to buildings:

- Adding floors greatly changes the original design of the building in question
- Adding floors to a listed building compromises the structure of the White City as an ensemble – and not only from the standpoint of the three UNESCO White City core zones.
- Adding floors alters use continuity and occupant structure owing to post-rehabilitation rent hikes.
- To the best of our knowledge, the rental income from adding floors to an apart-

(90) See the monument maps and list entries in the relevant area http://www.stadtentwicklung.berlin.de/denkmal/liste_karte_datenbank/de/denkmalkarte/index.shtml (30. 03.2014)



Figure 100: Reshaping of a building on Montefiore Street in Tel Aviv (2013)

ment building does not promote a durable solution to the financing of subsequent building maintenance and up-keep measures.

That said, in view of the prevailing circumstances (which are governed by the building code) and the special requirements that come into play here, we recommend that those concerned reflect upon Tel Aviv's existing construction practices, since construction will in any case undoubtedly continue apace both within and outside the UNESCO White City zones.

The question then arises as to how these measures should be carried out, so as to achieve "sustainable" heritage protection insofar as possible – and so that the changes that are made remain discernible, but without disfiguring the buildings in question. Rehabilitating buildings in a "felt" modernist style above all jeopardizes the authenticity of the historic ensemble. We recommend that serious thought be given to this aspect of change in the White City, in terms of changes in its heritage objects, and that, if possible, this issue be discussed via the Israeli-German cooperation network.⁹¹

Among the options that come into play here are design elements that create a clear demarcation between old and new elements. Such options include the following:



Figure 101: Corner apartment house with an added floor, Frug Street, Tel Aviv (2013)

- Delimitation through shaped elements such as discernible facade lines or contours
- Clearly recessed facade segments
- Using different materials or slightly different colours

In cases where a historical building facade is reintegrated, sufficient delineation can be achieved through the use of subtle contours – thus rendering the changes perceptible without marring the object's appearance.

(91) Relevant in this regard is what occurred in connection with the Bauhaus Siedlung Törten apartment complex, which was greatly disfigured owing to the new rules that were adopted in 1994. This change to all intents and purposes allowed for the creation of a new type of building (see section 3.3.2).



Figure 102: Eclectic-style apartment building with two added floors; Ahad Ha'am Street, Tel Aviv (2013). The entire third floor and the recessed penthouse were added in 2013. The only visible traces of this change are the reduced forms of the balcony balustrades.

7 The envisaged White City visitor and heritage conservation centre

Tel Aviv plans to establish a visitor and heritage conservation centre for the White City. This centre will comprise an administrative, documentation and information centre for White City monuments, and might also house a small cafe. Part of the building will be set aside for small exhibitions, whose main target audience will be students on class trips, tourists, and retired persons. We recommend that the following exhibitions as the most important permanent exhibitions concerning the White City also be involved: the one in the Bauhaus Museum Tel Aviv, which was founded by the US art collector Ronald Lauder (21 Bialik Street); and the one in the Museum of the History of Tel Aviv-Jaffa, which is located in Tel Aviv's historic city hall at (Bilak Street 27).

Ideally, the centre will strengthen cooperation between conservation researchers in Israel and other countries. The Dov Karmi apartment house at Idelson Street 29 has been provisionally selected as the site for the centre.

A feasibility study on this project was carried out in 2013⁹² and is now available in English. Our travels and research in Germany occurred shortly before the study was made available here. The main points made by the study and the study's main recommendations have been confirmed by independent research in Germany. Inasmuch as our observations on establishment of a visitor and heritage conservation centre in Tel Aviv are rooted in German thinking (based on German examples), they should be regarded as an adjunct to the recommendations already made in the feasibility study (also see section 1.7).

In the next section, we discuss heritage object information centres in Germany, all of which serve to inform various target audiences about the many aspects of a heritage object – from the manner in which specific object elements are dealt with on an everyday basis, to general tourist information concerning a complex UNESCO World Heritage Site. Using these German examples as a basis, we then discuss (a) the elements that we feel should be included in such a

centre; and (b) how these principles could be applied to the White City visitor and heritage conservation centre.

7.1 UNESCO World Heritage Site visitor centres in Germany

The German UNESCO commission has recommended that visitor centres be established for zones that are designated as World Heritage Sites:

"The establishment of a central visitors' centre that will be open on a daily basis in the World Heritage site is recommended. In the centre historic and geographical parameters should be explained to visitors as well as the specific reasons for inscription on the World Heritage List. UNESCO, the German Commission for UNESCO, and the World Heritage idea should be presented. For the ordinary visitor and tourist target groups it is important that information in the visitor centre is understandable and appealing. A small introductory exhibition could be set up and World Heritage publications made available."⁹³

These recommendations have already been implemented by the city of Regensburg, whose old town has been classified as a UNESCO World Heritage Site on the strength of its having been a crossroads of trade in the Middle Ages. The city uses the 16th century Salzstadel building as a visitor centre.⁹⁴

The Essen-based Stiftung Zollverein foundation converted part of the monumental building known as the Kohlenwäsche (coal cleaning facility)⁹⁵ into such a centre, and the World Heritage Site Völklinger Hütte opened its visitor centre in May 2014 in the steelwork's former sintering plant.

The UNESCO World Heritage Site comprising Harz, Stiftung Bergwerk Rammelsberg, Altstadt von Goslar, and Oberharzer Wasserwirtschaft plans to open five visitor centres in the coming years for its geographically far-flung World Heritage Site elements. The site operators we spoke with all indicated that these visitor centres play an important role. They all expressed the

(92) effectBIZ team, Management & business consultancy: Feasibility study for the establishment of the "White City" centre in Tel Aviv-Yafo, For: The conservation dept. Tel Aviv-Yafo Municipality, June 2013 (unpublished manuscript)

(93) Birgitta Ringbeck: Management Plans for World Heritage Sites. A practical guide. Bonn: German Commission for UNESCO, 2008, p. 48 http://www.unesco.de/fileadmin/medien/Dokumente/Bibliothek/Management_Plan_for_World_Heritage_Sites.pdf (07.02.2015)

(94) <https://www.regensburg.de/welterbe/besucherzentrum/59034> (04.04.2014)

(95) <https://www.zollverein.de/> (04.04.2014)

view that the main mission of such centres is to increase public awareness of the various World Heritage Sites.

These are only some of the visitor centres in Germany, whereby those mentioned here represent a clearly emerging trend.

7.2 Information for heritage building residents

When it comes to inhabited heritage buildings, it is as important to provide residents with information as it is to provide visitors with information.

The Dessau-Törten and Siedlungen der Moderne in Berlin (Siemensstadt) visitor centres are both doing an excellent job of providing residents with information.

7.2.1 Törten information centre in the Konsumgebäude building

The information centre for residents of the Siedlung Dessau-Törten apartments is located in the middle of the complex, in the former Konsumgebäude (designed by Walter Gropius), for which in any case a use was being sought.

This centre – whose continued presence in this location in winter 2013/2014 was not assured – is architecturally spartan. The centre has limited opening hours, but can also be visited by appointment – for which purpose the centre's rooms can be opened and heated during the winter. Depending on the age structure of the apartment complex's residents, the exhibition centres around information that residents often take guests and acquaintances to see (as a day's outing) during family celebrations or the like. If, for many visitors, this is their first time at the information centre, they nonetheless have been familiar with the apartment complex for many years, without having ever given much thought to its architectural importance. The main elements in the exhibition space are display boards and a large model of the apartment complex. The exhibit also offers oral history elements and a documentary.

The "Chicks on Speed" project being carried out at the apartment complex is in-

tended to evoke Walter Gropius's original idea of self-sufficient residential buildings. The project affords residents and pupils on class trips to borrow a portable chicken coop containing four hens for their back yard.⁹⁶ Schoolchildren – who are not known for their intense interest in historic buildings – are allowed to roam through the complex's buildings and over its garden walls at will.

Opening hours are assured by long-time residents of the complex, who either volunteer or receive a small wage for this service, and who enthusiastically provide visitors with information about the establishment, changes in, and occupancy history of the complex.

The Bauhaus Dessau Foundation is currently making efforts to ensure that the centre can remain at this site.⁹⁷

7.2.2 Informationsstelle Großsiedlung Siemensstadt information centre

The visitor information centre called Informationsstelle Großsiedlung Siemensstadt, which opened its doors in 2011 and is housed in a one-story pavilion-like former Fred Forbat-designed store, provides residents and tourists with information about the Siemensstadt apartment complex. The centre is operated by a cooperative housing association called Deutsche Wohnen AG, in partnership with Ticket B, a company that specializes in urban architecture guided tours. The centre's furnishings and technical equipment allow training sessions and meetings to be held (with presentations) for up to around 40 people at a time. The centre can also be rented out for private events.⁹⁸

The building housing the centre, whose refurbishment and energetic retrofitting were carried out in an exemplary fashion, has thus far been little used by residents. Hence the operator's main goal at present is to make residents more aware of the centre's existence. Owing to the centre's limited opening hours, the main tool for arousing interest in the centre are the posters in its display windows announcing upcoming rehabilitation measures, and explaining in an understandable fashion the need to up-

(96) <http://www.mz-web.de/mitteldeutschland/bauhaus-projekt-huehnen-in-dessau-sued-zumieten,20641266,17514456.html> (30.03.2014)

(97) <https://www.bauhaus-dessau.de/besichtigung-der-bauten/siedlung-dessau-toerten.html> (04.04.2014)

(98) www.welterbesiedlungen-berlin.de/de/info-station-siemensstadt.php (06.03.2014)

grade the complex's energy efficiency and renovate its heritage objects. Also on display are portions of plans and descriptions of envisaged measures such as window replacement, and installing insulation and junction boxes.

7.2.3 Informationsstelle Hufeisensiedlung Berlin-Britz information centre

The information centre for the Hufeisensiedlung Berlin-Britz housing estate is intended as an information centre for residents and visitors, as well as architecture enthusiasts, and has been operated jointly by Deutsche Wohnen AG and Ticket B since June 2012. The centre is located in a former retail space in the home at the northeast end of the housing estate. The adjoining homes were rehabilitated in an historically accurate fashion, at great effort and expense. Visitors have the opportunity to view a 1920s kitchen, a reconstructed period bathroom, and an historically accurate replica of a tenant back yard. The centre, which charges an admission fee, is open for a limited number of hours per week.

7.3 Model apartments and homes

Various German listed apartment buildings and housing estates now have model apartments/homes which, having been rehabilitated in an exemplary and historically accurate fashion, have been endowed with exemplary appointments. These projects also seek to carefully restore the homes or apartments in question to their original state. The manner in which these homes and apartments are used varies, but residents' experience with them has been altogether positive. We will discuss here a few examples of modernist objects, which are used for varying purposes and constitute exemplary solutions, e.g. as apartments (Siedlung Dessau-Törten apartment complex); as accommodations for residents' guests (Siedlung Dammerstock and Hufeisensiedlung Berlin housing estates); or as information centres (Siemensstadt and Törten apartment complexes).

7.3.1 Wüstenrot Foundation Baudenkmale der Moderne (modernist heritage objects)

The Wüstenrot Foundation supports exemplary rehabilitation projects, which they then publicize in their "Baudenkmale der Moderne" series. These publications mainly focus on the repair process, pre-project documentation, construction research, and restoration issues – all of which are covered extensively in an exemplary fashion. At the end of the related monographs are lists of all participating architects, interior designers and the like, authors of expert reports, and the contractors and suppliers for each of the various projects. This information enables interested members of the public to find out which companies achieved these outstanding outcomes, and to contact these companies if need be.

The following buildings have been rehabilitated as "Baudenkmale der Moderne" projects:

- The Le Corbusier/Pierre Jeanneret duplex at Weißenhofsiedlung complex in Stuttgart, which is now a museum that is open to the public
- The Schminke house by Hans Scharoun, in Löbau, which is now open to the citizens of Löbau as a "Haus der Begegnung" (gathering place).
- The Muche/Schlemmer and Walter Gropius houses in Dessau, which are also now used as museums.
- The Einsteinturm building by Erich Mendelsohn (in Potsdam), which is now part of the Leibniz Institute for Astrophysics in Potsdam (AIP), which small groups can visit by appointment.

Numerous detail solutions (some of them new) were developed for some of these examples, e.g. for problematic roofs, upgrading rusted metal elements, repairing or rebuilding windows and doors, and appointments. Because such elements often pose major problems for private owners and their architects, the referenced examples are not only best-practice examples of research into modernist buildings, but also constitute best practice in the documented processes, investigations prior to and during projects, documentation, con-

struction site operation, and project realization.

Inasmuch as access to the majority of these modernist objects is not limited merely to specialists, visitors have the opportunity to see for themselves the impact of astonishing interior colour schemes and surface designs – and are thus motivated to become more aware of the historical objects in their own environment.

7.3.2 *House at Am Rupenhorn 25 in Berlin*

In cases where a home, apartment or apartment house is restored in an exemplary fashion, the object in question can be open to the public, or can be made available for conferences and other cultural events – and a fee can be charged.

One example of such an object is the extraordinary Luckhardt/Anker house at Am Rupenhorn 25 in Berlin. This exceptional building was purchased by owners committed to restoring it and who initially lived in the house. Over the years the owners of the house reconstructed it in stages to its presumed primary designed state (but still upgraded and true to its original building physics) using a combination of their own and public funds. Despite the considerable expense of maintaining this home, it is now open to members of the public, who are asked to make a voluntary donation; it is also used for architectural salons. The house was restored in such a way that it is obvious to experts where original elements have been accurately preserved, where elements have been reconstructed, and where elements have been changed and/or reintegrated based on surmises or actual evidence. Some changes, as well as elements added by the owners such as wall shelving on the upper level and radiator placement in the library, are not readily noticeable at first sight.

Display cases on the basement contain historical elements that were found at the site, as well as historical photos. A small portion of the house was not restored to its original (1930s) state, and the surfaces of a non-original bathroom were also left intact.

The house at Am Rupenhorn 25 is one of the four German objects discussed in this report.

7.3.3 *Model apartment at the Siedlung Dammerstock apartment complex in Karlsruhe*

The small Baugenossenschaft Hardtwaldsiedlung model apartment in the Siedlung Dammerstock apartment complex in Karlsruhe, which is completely different from the Am Rupenhorn 25 house, is located in the Walter Gropius Laubenganghaus (apartment building whose apartments are accessed from their balconies).

The apartment, which was unfurnished as of early 2014, is slated to be rented out by Dammerstocksiedlung residents as a furnished guest apartment, and will also be made available to researchers.

Virtually all of the surface materials and colours of this elegant apartment were restored to their original state, based on the relevant findings. Fixed structural/architectural elements that were slated for removal from other apartments were combined so as to create an optimally high-impact impression of the original (and now restored) colours, surfaces, and structural and architectural details. For example, elements of the original built-in kitchen cabinets and light fixtures from a neighbouring apartment were installed in the model apartment. Particularly noteworthy is the cautious and extremely delicate fashion in which the original structural and architectural elements were restored. For example, the 1970s wallpaper that was used to line the inside of a built-in kitchen cabinet was left intact, as an example of historical detailing and traces of actual use. Such details provide insight into the attitudes of residents, designers, and conservation authorities toward the building's various heritage values, to which decades-long uninterrupted use of the apartment bear testimony. This exemplary approach to conservation of the interior of the Dammerstocksiedlung model apartment is also evidenced by the manner in which the structural fabric of the facade was handled. The windows were partly replaced, but the slightly bowed grey-painted metallic window sills were left intact, with all their deformations. Here too, the conservation of altered authentic details was prioritized over replacement.

This reference apartment clearly shows that judicious rehabilitation can be

achieved with relatively minor construction measures, and without unduly disturbing the building's residents. This type of approach makes both owners and residents more open to judicious and historically accurate rehabilitation.

7.3.4 *Bruno Taut house in the Hufeisensiedlung Berlin-Britz housing estate*

The 65 square meter house in the Hufeisensiedlung Britz housing estate in Berlin-Neukölln by Bruno Taut is an extraordinary demo home. Rehabilitation and restoration to the object's original (1920s) state, as well as use of the object as a small hotel and for heritage conservation education purposes, were accomplished by private owners, who lavished tremendous care and attention to detail on the project. These efforts were recognized in 2013 when the Europa Nostra Award and Berliner Denkmalpreis (Berlin heritage object award) were bestowed on the building. The Taut house as well as the organization known as Freunde und Förderer der Hufeisensiedlung Berlin-Britz (Friends of the Hufeisensiedlung Berlin-Britz apartment complex) have also won the Ferdinand von Quast Medaille. The house, which has been magnificently restored to its original colour, is rented out (along with its grounds) fully furnished.

The house is offered for rent via an appealingly and intelligently designed website,⁹⁹ which beautifully presents information about the housing estate as a whole, and the architecture and restoration of the house. Links on the site enable users to readily access further information about the Hufeisensiedlung housing estate, the Deutsche Wohnen AG demo home, and the Hufeisensiedlung visitor centre.

The room-rental concept was devised by the owners, who were also involved in designing the exhibition at the visitor centre. The income from renting out the hotel's rooms is used to refinance the restoration work, which was carried out without government subsidies.

The object has central heating and wireless internet, but still has its historic tiled ovens and myriad other original structural and architectural details such as door handles and xylolite floors.

The Taut home and its room-rental concept have been well received online, as well as by experts and journalists.

7.3.5 *Demo home (to show prospective buyers) at Hufeisensiedlung Berlin-Britz housing estate; operated by Deutsche Wohnen AG*

Apart from the Taut demo home, the Hufeisensiedlung housing estate also contains another demo home (on Talberger Straße), which is under the management of the housing development company Deutsche Wohnen. The object's facades were painted in accordance with the tenets of good-practice heritage conservation. The website¹⁰⁰ of this demo home contains photos of the Hufeisensiedlung housing estate renovation, which was carried out by Deutsche Wohnen. For example, there are pictures showing the following in regard to the renovation of a house on Onkel-Bräsig-Straße: living space that was added to the roof of the house; skylights added on the back-yard side of the house; and opening up the kitchen to the living space. A photo gallery on the website contains before and after pictures of the renovation, thus enabling users to see the extent to which the house was changed, and the impact of these changes.

We have discussed this house in order to show an example of the leeway that is available within a single listed housing estate, notwithstanding its likewise being subject to UNESCO World Cultural Heritage strictures.

7.4 Construction archive

In Germany, construction archives, as overarching institutions for the permanent archiving of the structural and architectural elements of historic buildings, are few and far between. Increasingly, however, the owners of listed buildings (particularly those that are classified as UNESCO World Heritage Sites) are electing to archive elements removed during rehabilitation projects, as proof, and so that they can be used for research and practical purposes – for example as templates for reconstruction/restoration. In the following, we describe two construction archives that we regard as exemplary.

(99) <http://www.tautes-heim.de/> (28.04.2014)

(100) <http://www.hufeisensiedlung-berlin.de/kaufangebote-besichtigung.html> (28.04.2014)

7.4.1 *Bayerisches Bauarchiv Thierhaupten*

The Bayerisches Bauarchiv (Bavarian construction archive), which is located in the former Thierhaupten Benedictine monastery and was established in 1989, is part of the Dienststelle des Bayerischen Landesamtes für Denkmalpflege (heritage conservation authority) in Thierhaupten. The archive is jointly run by Freistaat Bayern and Bezirk Schwaben. The core of the archive comprises a comprehensive collection of structural elements comprising around 6,000 objects in an approximately 3,000 square meter warehouse. The collection contains a broad range of objects, from fragments of Romanesque buildings to elements from the Munich Olympics stadium. The collection also contains doors, windows, tiles, and models of various roofs. The archive is based on the concept that lessons can be learned from the buildings of the past. Conservation techniques and procedures are tested in the archive's workshops. The archive also contains restoration workshops for wood, masonry, plaster and glass elements.¹⁰¹

On 4 March 2014 we were taken on a guided tour of the archive, led by Julia Ludwar, who told us that the Bayerisches Bauarchiv is probably the only institution of its kind in Europe. The archive is intended to serve educational purposes and enable interested parties to view the archive's holdings, via a

viewing archive containing reference examples of the restoration of structural elements; this viewing archive is open to professionals. The Bayerisches Landesamt für Denkmalpflege (Bavarian state office for heritage conservation) acquires objects for the archive in cases where elements are removed from their original setting as the result of the demolition or rehabilitation of historical objects. Documentation of a building element's specific setting is as important as the element itself. Thus after being catalogued, new acquisitions are investigated in the relevant workshop and are prepared for archiving. The archive contains storage shelves for smaller objects, and special racks that accommodate larger objects such as door and window frames.

Apart from the viewing archive, Thierhaupten also has a pedagogic collection that is housed in a conservation training and consulting centre known as Fortbildung- und Beratungszentrum für Denkmalpflege.¹⁰² This facility allows for the conservation and expansion of practical knowledge concerning the handling of historical building elements, techniques and materials; the centre also will make it possible for these elements and know-how to be preserved for and passed on to future generations of building tradesmen and restorers. To this end, the Bayerisches Landesamt für Denkmalpflege in Thierhaupten offers training and seminars.

(101) <http://www.blfd.bayern.de/bau-und-kunstdenkmalpflege/bauarchiv/index.php/> (05.03.2014)

(102) The centre's interpretive signs can be found in: Klotz-Warislohner, Gerhard: Zur Ausstellung, in: *Handwerk und Denkmalpflege. Die Zukunft des baulichen Erbes im Alpenraum, Inhalte – Projekte – Dokumentationen, Schriftenreihe des Bayerischen Landesamtes für Denkmalpflege Nr. 1, München 2010*, pp. 112 ff.



Figure 103: Pedagogic collection of the Fortbildung- und Beratungszentrum für Denkmalpflege (Heritage conservation training and consulting centre). This picture shows a collection of historic windows and shutters.

7.4.2 *The Dessau construction archive*

The Bauhaus Dessau Foundation's construction archive, which specializes in Bauhaus buildings, contains an extensive catalogued collection of building elements, which is intended for use by the Dessau-Törten conservation authority, as well as other stakeholders. The facility, which was founded nearly four decades ago as an archive, now qualifies as a construction archive, by virtue of the collection of building elements that the archive has amassed over the years. The Dessau construction archive also has a collection of Bauhaus artefacts, which are archived separately.

*"The historical archives were established in 1976 to mark the 50th anniversary of the Bauhaus building. Its collection of written and visual material helps to protect and conserve the cultural heritage, while promoting research and reflection on the history of the Bauhaus and assisting exploration of potential historical precedents for town planning in the 21st century. The main focus of the collection is the Dessau phase from 1925 to 1932. The exhibits, which include graphics, sculptures, paintings, drawings, photos, pieces of furniture, architectural plans, teaching notes and exercises from classes held by Bauhaus Masters and works by the Masters themselves, all provide insights into the most creative period of the historical Bauhaus. The collection relating to the current work of the Foundation includes systematic documentation of Kolleg design projects, studies and plans for urban research or the findings of building research work. Both the historical and the contemporary holdings are supplemented amongst other things by extensive photo and video documentation and a collection of designs and plans."*¹⁰³

The foundation's construction archive is located not on the historic Bauhaus campus in Dessau, but rather in a large former 19th century brewery, which has been rehabilitated in an historically accurate fashion and whose energy efficiency has been upgraded. The working and storage conditions at this facility are also ideal for large objects such as steel-frame window elements spanning two or more floors, large doors, radiators, and the like. The collection of building elements comprises a very broad range of object types, such as masonry bricks, historic floor elements, floor-

ing, insulation, water pipes and other installations, switches, windows, glazing, and so on. All of these objects are carefully labelled and are managed using a digital archiving system.

The construction archive's mission is to archive reference elements for the reconstruction and restoration of individual building elements. The archive can provide contact information for companies that still work with and/or restore these historic building elements. Many such companies are located outside of Germany – a fact attributable to, among other things, the networking activities of long standing by experts with Docomomo, universities and other prestigious institutions in foreign countries.

The archive's holdings currently include the following, among other elements: 25,000 original exhibits; thematic documentation; historic objects; the outcomes of construction research and of Bauhaus and modernist building rehabilitation projects. The most extensive historic holdings comprise bequests from the estates of the following figures: Franz Ehrlich, Carl Fieger, Reinhold Rossig, Friedrich and Alma Else Engemann, Konrad Püschel, Hannes Meyer and Lena Meyer-Bergner; a series of elements concerning Marianne Brandt; and works from the Bröhan collection. The photography and graphics department handles material concerning foundation projects, the history of Bauhaus architecture, and workshops, pedagogic models, architecture, Bauhaus life, and institutional history.¹⁰⁴

7.5 The Water-Energy-Building training and transfer (WEB-TT) project: an example of international cooperation with professional-training institutions

The WEB-TT¹⁰⁵ project is of interest in connection with the establishment of a heritage conservation centre in Tel Aviv. The objectives of (see below) and the activities entailed by the German-Egyptian project (funded by the German Ministry of Education and Research) could serve as a model for German-Israeli cooperation in the field of heritage conservation training.

(103) <http://alt.bauhaus-dessau.de/de/archive.asp?p=bau> (05.02.2014)
Translated from German

(104) <http://alt.bauhaus-dessau.de/de/archive.asp?p=schriften> (04.02.2014)

(105) <http://www.web-tt.org/> (25.01.2014)

"The objectives of the project during the funding phase are as follows:

- Opening up of German-Egyptian transfer and export structures (...)
- Development and testing of exemplary technology and training components for pilot projects and exemplary measures.
- Merging of professional-training export-package components, including marketing strategies, and accreditation and certification measures.
- Realization of a pilot project involving establishment of an initial and in-service training centre in the Cairo region.
- Development of long-term operator models.
- Dynamic and direct derivation of research findings to professional training, via region-specific activities of TU Berlin university's El Gouna campus in Egypt – the goal being to implement and market new technology through initial and in-service training of installation and maintenance technicians, and of mid-level planning managers.
- Derivation and development of transferable concepts or export guidelines for additional technological domains and other countries in the region, or possibly in the international sphere as well.
- Laying the groundwork for integrating this project and its system into a framework for the post-funding period."¹⁰⁶

The extent to which such undertakings can actually be carried out mainly hinges on personal relations, which can only be achieved if the individuals concerned spend time in the relevant locations and get to know each other. Only in this way can training-export programs (particularly for the building trades) and train the trainer programs be implemented. Successful German participation in the WEB-TT project was assured by reliable and experienced¹⁰⁷ partners from the academic and building trades communities. The project was coordinated by the Berlin Technical University Department of Professional Training (IBBA).

7.6 Scientific research lab

In restoring historic materials, it is crucial to know the provenance and composition of the extant original materials, and which aging properties these materials have developed in their specific settings. In order for suitable restoration strategies to be devised and suitable restoration materials and techniques to be used, this fundamental information needs to be available. Moreover, when it comes to actual heritage conservation, there is a tremendous need for basic research on materials and historic construction methods. Germany has a number of public and private sector labs that a highly specialized heritage management and conservation lab in Tel Aviv could be modelled on.

As far as we could tell from our conversations with representatives of the Tel Aviv Conservation Team, as well as from the available documentation, no labs that specialize in heritage conservation currently exist in Israel. Such a lab could be established using the expertise of two Israeli institutions: the Chemistry Conservation Laboratory of the Israel Museum in Jerusalem, and the Zinman Institute of Archaeology at Haifa University.

7.6.1 *Materialprüfungsanstalt Stuttgart (MPA Stuttgart)*

Of particular relevance in terms of using construction and other materials for heritage conservation is the Otto-Graf-Institut (aka Materialprüfungsanstalt Universität Stuttgart, or MPA Stuttgart), whose director is Harald Garrecht. Numerous conservation professionals avail themselves of this institution. The Baden-Württemberg office of heritage conservation often turns to the Otto-Graf-Institut for advice on modernist building-physics properties about which little is known.

The various MPA Stuttgart departments carry out training programs and projects that are highly germane for heritage conservation. Thanks to their professional expertise, many MPA Stuttgart staff members serve on examination, technical and standards committees, in Germany and abroad, and are involved in numerous important conservation projects.

(106) Projektsteckbrief W.E.B.-T.T. – Water-Energy-Building – Training and Transfer – Berufsbildung im Bereich ressourceneffiziente Gebäude- und Versorgungstechnik (Wasser / Energie) (<http://www.azb-hamburg.de/fileadmin/redakteure/projekte/WEB-TT-Projekt-Steckbrief.pdf> (25.01.2014).

(107) The following entities were instrumental for realization of this project: Ausbildungszentrum-Bau in Hamburg GmbH, Handwerkskammer Osnabrück-Emsland, Bundesbildungszentrum des Zimmerer- und Ausbaugewerbes GmbH in Kassel, German Water Partnership e.V. in Berlin, ModernLearning GmbH (learning using new media) in Berlin, inter 3 GmbH Institut für Ressourcenmanagement in Berlin, and WILO SE in Dortmund.

MPA Stuttgart also participates in many research projects either as a partner or project coordinator. Such projects pertain to (among other things) research on steel and concrete, and their signs of fatigue secondary to corrosion and loads.

“The department focuses on research and investigations on corrosion and deterioration processes in metallic and historic construction materials, and on construction polymers. Using these investigations as a starting point, rehabilitation and maintenance strategies for damaged buildings and building elements are elaborated. The attendant measures include investigations of the surface protection systems of metallic and historic construction materials, the aim being to protect such materials using plastic-based or plastic-containing coatings.”¹⁰⁸

Through its applied research, MPA Stuttgart is involved in the development of solutions for heritage rehabilitation and restoration processes, in Germany and abroad.

7.6.2 Bayerisches Landesamt für Denkmalpflege central lab

The Bayerisches Landesamt für Denkmalpflege (BLD; Bavarian state office for heritage conservation), whose head office is in Munich, maintains a proprietary central lab that provides desk officers and restorers with advice on physics and chemistry related issues in connection with restoration measures. The BLD has expertise in basic materials-testing techniques. Since 1984, the BLD has also undertaken heritage conservation research for outside parties, and has close ties with institutions and individuals in the German conservation community. The BLD is part of an international network that is an outgrowth of Access Research and Technology for the Conservation of the European Cultural Heritage (Eu-ARTECH; 2005-2009). Beginning in 2009, the Eu-ARTECH project was continued under the name CHARISMA.¹⁰⁹

7.6.3 Institut für Steinkonservierung e.V. (IFS)

Institut für Steinkonservierung e.V. (IFS) in Mainz, Germany, specializes in plaster and natural-stone restoration, and is jointly operated by the respective offices for heritage

conservation in Hesse, Rhineland-Palatinate, Saarland and Thuringia.

“The IFS serves as a scientific consulting facility for heritage conservation. It provides offices for heritage conservation with advice on material related matters for current restoration measures for natural-stone historical buildings and conducts research in this field. (...) In the interest of finding solutions for basic cross-regional or cross-disciplinary problems concerning natural-stone conservation, projects are conducted in collaboration with university engineering and science departments, and the findings of such projects are implemented in heritage conservation practice.”¹¹⁰

The IFS provides information concerning both old and new mortar and natural stone, as well as on methods that are relevant for the restoration of these materials. The IFS also maintains a proprietary natural-stone register and sandpit register, and conducts research on historic and modern construction related uses of lime, lime mortar, and lime paint. IFS publications provide information on key heritage conservation issues.¹¹¹

7.6.4 Labor Jägers, Bornheim

Germany also has excellent private sector labs, in addition to the country's public sector labs. Labor Jägers, which is run by chemists Elisabeth Jägers and Erhard Jägers, has for decades now been carrying out research and testing on the scientific contexts of historic and modern materials, on aging behaviour, and on the causes of deterioration, in the fields of heritage conservation and restoration. Thanks to these many decades of work on these matters, the lab has unique and extensive expertise that is sought out by experts the world over.

The connection between theory and practice is strongly inspired by Jägers' professorship and courses in the Cologne University of Applied Sciences' Institute of Conservation Sciences.

7.7 Digital data archives

We will now describe three exemplary databases in the regional state of Baden-

(108) http://www.mpa.uni-stuttgart.de/organisation/fb_4/abt_41/index.html (07.02.2014) Translated from German

(109) Mach, Martin; Snethlage, Rolf; Bitner, S.: Access, Research and Technology for the Conservation of the European Cultural Heritage (Eu-ARTECH) 2010, http://www.blfd.bayern.de/medien/projekt_artech.pdf (07.02.2014)

(110) <http://www.natursteinmonitoring.de> (06.02.2014) Translated from German

(111) Institut für Steinkonservierung e.V. (Hrsg.): Denkmalschutz und Energieeinsparung. Stand der Dinge fünf Jahre nach der EnEV 2007. IFS-Bericht Nr. 41 – 2012. Tagungsband zu einer Veranstaltung am 9. Februar 2012 im Schloss Biebrich in Wiesbaden, Mainz 2012; also see http://ifs-mainz.de/images/ifs_downloads/Infos%20Berichte/Bericht%20Nr.%2041.pdf (06.02.2014) Institut für Steinkonservierung e.V. (Hrsg.): Substanzschonende Betoninstandsetzung denkmalgeschützter Bauwerke. IFS-Bericht Nr. 30 – 2008, Mainz 2008 (extracts: http://ifs-mainz.de/images/ifs_downloads/Infos%20Berichte/Bericht%20Nr.%2030.pdf (06.02.2014)

Württemberg containing data on various aspects of heritage conservation.

7.7.1 ADABweb

The ADABweb database, which is the central database for the respective offices for heritage conservation in Baden-Württemberg and Lower Saxony, is updated continuously with geo data, aerial photos and historic photos. The database is currently available solely to staff of the aforesaid offices of heritage conservation. As of 2009, the database already contained 170,000 archaeological, construction history and art history objects. The database also contains around 40,000 blueprints and building layouts (which are also updated), as well as archaeological excavation plans. The database is a useful resource mainly for Baden-Württemberg heritage conservation officials, as it contains official heritage lists and justifications for inscription, thematic maps and so on.¹¹²

7.7.2 *Bauforschung-Restaurierung database*

The second important heritage conservation database in Baden-Württemberg is known as the *Bauforschung-Restaurierung* (construction research/restoration) database, which since 2004 has been integrating individual projects. The database was established by Landesamt für Denkmalpflege and Regionalgruppe des Arbeitskreises für Hausforschung e. V., mainly for the purpose of conducting research on historic buildings. The information in the database is compiled with this aim in mind. The database has a section that can be viewed by the public, so that projects that are carried out by private sector entities can be viewed online. The non-public areas of the database can also be viewed, subject to issuance of a password.¹¹³ This kind of public access is widely viewed as being exemplary.

7.7.3 *Monarch database*

The third important heritage conservation database in Baden-Württemberg is the Monarch database, which is the most recent digitalization project realized by the Baden-Württemberg office for heritage conservation. This database, which is a dedicated database for the Weißenhof-

Siedlung housing estate in Stuttgart, is more basic-research oriented than the two other databases described above. Being new, the database is not yet available to the general public.

The Monarch database was originally developed by Passau University for ecclesiastical buildings, and was later modified for the Weißenhof-Siedlung housing estate in Stuttgart. Development of the database for the said housing estate currently has financing from Baden-Württemberg for May 2013-May 2015.

In the run-up to establishment of the database, construction research was conducted in Stuttgart on the Le Corbusier duplex in the Weißenhof-Siedlung housing estate there. This research revealed that little was known about the origins of and changes in the housing estate, particularly in terms of the 1981–1987 renovation, which was conducted in three phases, and which at the time was regarded as a pioneering heritage conservation project for modernist buildings in Baden-Württemberg.

Heritage conservation status plans¹¹⁴ are elaborated using the Monarch database. These plans are of major significance for relations and interaction between all conservation site stakeholders, in terms of ensuring compliance with heritage-relevant status criteria, particularly in terms of the pending energy-efficiency upgrading measures.

7.8 Recommendations concerning a visitor and heritage conservation centre for Tel Aviv's White City

We have thus far presented various German examples of heritage conservation with various focuses that could potentially play a role in raising awareness of heritage objects among a broad range of interest groups.

Be this as it may, a visitor and heritage conservation centre should be established in the White City; whereby both "visitor" and "heritage" have been included in this putative name for a good reason. The centre should provide White City residents and non-residents with information and should

(112) <http://www.denkmalpflege-bw.de/denkmaledatenbanken/adabweb.html> (05.02.2014)

(113) <http://www.bauforschung-bw.de/> (05.02.2014)

(114) These plans provide insight into how historic structural fabrics are to be handled. The various elements of a given building are classified, depending on their value and condition, as "conservation essential," "conservation recommended, with some reservations," "may be altered," and so on.

allow for heritage conservation issues to be addressed in many different ways.

The need for such a centre is self evident, and a feasibility study for such a centre has already been conducted.¹¹⁵ This study centred around the following issues:

1. Domestic and foreign tourism, with an emphasis on educational and training programs for public institutions; needs and market analysis involving comparisons with visitor and heritage conservation centres in foreign countries, and conservation training programs available in Israel. The target groups identified for the centre are college students, tourists, experts and owners of houses who are particularly interested in conservation related issues.
2. A White City site feasibility study for the centre was conducted for the Max Liebling building at Idelson Street 29 (see section 3.2.2). This site's feasibility in terms of building accessibility, ease of access to mass transit, and the building's space was investigated. The cost of establishing the centre at this site is estimated at €1.5 million. The study found that this site is suitable for the centre.
3. Economic operator model, including a sensitivity and risk assessment and risk management assessment: Investigation of two different models revealed that the centre cannot be assessed based on profitability alone, since, in view of its relatively low projected income, it would not be able to cover its own operating expenses. What was emphasized, on the other hand, was the added value of such a centre for Tel Aviv. The study recommended that the possibility of third party financing (e.g. from donations) be looked into.
4. Strategic use related outlook, and "non-material" value for the city of Tel Aviv: There is a clear need for information to be disseminated in Tel Aviv concerning the exceptional worldwide importance of the White City as a UNESCO World Heritage Site. This need pertains both to Tel Aviv residents and to visitors to the city. In the interest of strategic project development, the following recommendations were made:

- The White City as a brand related to Tel Aviv that should be established more robustly.
- The envisaged visitor and heritage conservation centre should endeavour to be in the vanguard of the discourse on conservation measures, in the centre's capacity as a multi-disciplinary institution. This vanguard role could eventually extend beyond the city of Tel Aviv, to Israel as a whole and the international community as well.

Our recommendations concerning the envisaged White City visitor and heritage conservation centre mainly focus on the nuts and bolts of such a centre, rather than the economic and marketing dimensions. These recommendations also draw upon the executive summary of the EffectBIZ feasibility study, which states that the centre should aim to be in the vanguard of the international conservation discourse concerning modernist buildings. In formulating our recommendations (and likewise in keeping with the EffectBIZ summary), we were also presuming that the centre cannot be established using its own financial resources, and that it will require a continuous infusion of outside financing.

The White City should have a visitor and heritage conservation centre comprising various departments and offering various programs. In light of German experience with heritage conservation, apart from tourism the following elements are indispensable for heritage conservation in the White City:

1. A **focal point for White City residents** offering programs such as lectures, courses and the like that strengthen White City residents' identification with the White City (see section 7.2).
2. A **exemplary apartment** along the lines of the Bauhaus Dammerstocksiedlung apartment complex should be built in the centre of the White City, and a demo home should be built at a peripheral location (see section 7.2).
3. A **lab** should be established that conducts **scientific research** along the lines of the work done at the Institut für Steinkonservierung (see section 7.6.3).

(115) Unpublished BMUB report: Feasibility study for the establishment of the "White City" centre in Tel Aviv-Yafo, For: The conservation dept. Tel Aviv-Yafo Municipality, June 2013; author: Effectbiz team

4. A **digital archive** along the lines of the Monarch database (see section 7.7.3), together with digital room books (see section 4.6.1).
5. A **document archive, library**, photograph collection, and architectural plan collection.
6. A **building element and construction archive** dedicated to Bauhaus buildings, along the lines of the Dessauer Bauforschungsarchiv and organized like the Bayerisches Bauarchiv Thierhaupten (see section 7.4).
7. A **pre-service and in-service training centre**
8. **Network centre**¹¹⁶
9. **Tourism:** Offerings very precisely tailored to specific target groups, as suggested in the EffectBIZ feasibility study. In addition, the historical and geographical parameters, and the specific justifications, for adding a given building to the World Heritage list should be defined. Such parameters should be formulated in the manner recommended by the German UNESCO commission (see section 7.1).

7.8.1 Tourist information centre

We feel that it behooves the Tel Aviv city government to establish an information centre for tourists and professionals in the White City, and in so doing to define the "brand" White City. This would afford citizens the opportunity to determine the nature and intensity of the White City "brand," based on scientific and social knowledge.

Currently, the Bauhaus centre on Dizengoff Street is the main source of tourist information on the White City, along with a very interesting website.¹¹⁷ The centre also features a privately operated bookstore containing an extensive range of books on the International and Bauhaus styles. This bookstore also serves as a useful jumping off point for Israeli and foreign visitors to the White City, as well as residents of the White City. The bookstore also offers the following: small permanent exhibitions and many temporary exhibitions; videos; lectures on germane topics; architectural tours of Tel Aviv; a map showing the buildings in the various protected zones.

7.8.2 Information for White City residents

The centre should provide White City residents with specific information concerning how White City buildings should be handled. This could include, for example, general information concerning use, renovation, and energy upgrading of houses and apartment buildings. A platform for White City residents would also be useful, e.g. providing an apartment swapping website for elderly residents who live on the upper floors of buildings that have no elevators or for apartment dwellers in search of roommates.

In creating a website specifically for the residents of Tel Aviv, the exemplary structure of the website of the Verein der Freunde und Förderer der Hufeisensiedlung Berlin-Britz (Association of friends and supporters of the Hufeisensiedlung Berlin-Britz housing estate), whose construction is still in progress, could potentially be used as a model. The mission of this website and its operator is as follows:

*"This website was developed specifically for the residents of this World Heritage Site, for the purpose of providing residents with information concerning the history of the housing estate and raising their awareness about heritage protection in general. Information and building details are presented here that will make it easier for owners to obtain building permits for necessary heritage building renovation, repair and upkeep measures. (...) In the interest of enabling you to gain an impression of the value and use of this website, we have posted here (with the respective owners' and residents' permission) two examples of heritage buildings (...)."*¹¹⁸

The goal of this website is to convey information concerning energy upgrading, historical architectural and structural elements, and phased renovation.

In the "Nachbars Forum"¹¹⁹ (neighbours' forum) section, object owners can enter the names of proven and trustworthy building contractors. A forum on historical structural and architectural details and construction materials for historically authentic building renovation is already up and running.

(116) Übernahme und Fortführung der durch das BMUB aufgebauten Netzwerkstruktur Weiße Stadt Tel Aviv <http://www.bmub.bund.de/themen/stadt-wohnen/nationale-stadtentwicklung/baukultur/netzwerk-weiße-stadt/> (07.10.2014)

(117) <http://www.bauhaus-center.com> (01.05.2014)

(118) http://www.hufeisensiedlung.info/no_cache/denkmal-basisinfo.htm (29.04.2014) Translated from German

(119) http://www.hufeisensiedlung.info/no_cache/denkmal-basisinfo.html (28.04.2014)

Although this website went into operation only recently, it is already a resounding success¹²⁰ – which is why we recommend it as a model for a putative Tel Aviv visitor and heritage conservation centre.

7.8.3 Importance of demo homes and apartments

Integrating into heritage apartment complexes or housing estates model apartments or homes that are open to the public is highly worthwhile. Such houses or apartments, which have been remodelled in an historically accurate fashion (see section 7.3), trigger debate in neighbourhoods far beyond the bounds of the complex/tract in question – debate that can potentially promote conscientious heritage building rehabilitation. Heritage buildings that have been restored in an exemplary fashion can potentially raise visitors' awareness concerning conservation of the structural fabric of such buildings and ecological sustainability.

7.8.4 Scientific research lab

To the best of our knowledge, Tel Aviv's Conservation Team does not work with specialized restoration labs yet. In light of what needs to be accomplished in order to sustainably preserve period buildings, research into the relevant scientific underpinnings is absolutely indispensable for such projects. For the reasons noted elsewhere (see section 7.5), such a lab should have the wherewithal to conduct the relevant specific technical analyses and to carry out research on historic buildings exceeding the scope of such analyses. We therefore recommend that such a lab be established as a department of the putative visitor and heritage conservation centre, as doing so would underscore the need for the centre to also play a leading part internationally in issues related to modernist buildings.

7.8.5 Document archive and library

A comprehensive collection of manuals and documents on period construction and technical fit-out techniques should be established. To this end, we recommend that

duplicates and bequests be solicited from German and other European libraries and archives, as well as from the families of the relevant architects. University architecture departments undoubtedly have a wealth of literature on construction materials and industrial products from the 1930s, as well as textbooks from this period. The architecture department that was built up by Alexander Baerwald at Haifa University in emulation of counterpart German departments is highly relevant in this regard. Rare books stores are also a good source of books and magazines from architects' estates. Such materials should be systematically collected, as they oftentimes allow researchers to make discoveries about historic construction materials directly in the publications themselves.

7.8.6 Construction archive, photo collection, and architectural plan collection

Establishment of a construction archive in Tel Aviv constitutes the single most important feature of a visitor and heritage conservation centre that can potentially resonate on the international level, provided that such an archive is made accessible to researchers and specialists.

In our view, the former site of the Magen-Adom emergency hospital on Mazeh Street would be a good venue for such an archive, as it has the necessary space. Thanks to its ample size, this building already has much of the necessary infrastructure by virtue of its facilities for deliveries by minivans, and its freight elevators.

We also recommend that Israeli specialists exchange information concerning archive holdings with the Bauhaus Foundation construction archive in Dessau and the Bayerische Denkmalpflege construction archive in Thierhaupten. For the Tel Aviv Conservation Team, use of a construction archive would be of fundamental importance as a resource for building restoration, as well as an information resource for members of the building trades, building contractors, and building owners.

(120) http://www.hufeisensiedlung.info/foerderverein/show-tt-news.html?tx_ttnews%5Btt_news%5D=17&cHash=d9c83116aa69da62395c902681db6a25 (16.09.2014)

7.8.7 *Pre-service and in-service training centre*

In line with comparable German building-trades institutions in Schloss Raesfeld¹²¹ and Rittergut Trebsen,¹²² as well as the Austrian heritage authority institution Kartause Mauerbach (near Vienna),¹²³ the envisaged visitor and heritage conservation centre should offer conferences, workshops and courses that would allow for sound initial and in-service training on construction research, building documentation methods, and historic construction techniques. Such offerings would be aimed at a wide audience comprising members of the building trades, restorers, architects, planners, heritage-object curators, and scientists.

Germany's Deutsche Stiftung Denkmalschutz (German foundation for cultural heritage management) holds so called Denkmalakademien¹²⁴ at numerous venues. These courses and workshops are a lynchpin for the training of heritage conservation officials, architects, engineers, and historians, as well as building-trades technicians and restorers. The expertise available from this extremely well networked entity could be of great use in designing and implementing in-service training courses in Tel Aviv. We therefore recommend that the head of this entity, Ingrid Scheurmann.

Likewise relevant here is the construction archive in Thierhaupten and the pedagogic collection¹²⁵ at the Fortbildung- und Beratungszentrum für Denkmalpflege (see section 7.4). These institutions make it possible for these elements and know-how to be augmented, preserved for and passed on to future generations of building tradesmen and restorers. To this end, the Bayerisches Landesamt für Denkmalpflege (Bavarian state office of heritage conservation) in Thierhaupten offers training and seminars. Using objects from the construction archive, exemplary building conservation methods are tested and communicated to experts in the relevant fields. One of the current focuses is on upgrading the energy efficiency of historic windows. Courses are sponsored by the Landesamt, and course schedules are regularly posted on the construction archive's website. These courses are aimed in particular at members of the building trades, architects,

planners and building owners. Current course schedules are posted on the construction archive's website.¹²⁶

Another example of a highly successful and practice oriented endeavour are the cooperative arrangements between universities and job-training institutions, which gave rise to (among other things) the WEB-TT project (see section 7.5). These undertakings are primarily notable for their international orientation.

Training is also available in the private sector, from manufacturers,¹²⁷ who provide invaluable practical training on the use of their products for heritage conservation purposes. Like other makers of industrial products, these manufacturers would very much like to see their products used properly by planners and users, as this promotes sales of these products.

7.8.8 *White City cooperation network office*

A Tel Aviv office should be established for the White City cooperation network. This office would need office space of the type available at the Idelson Street 29 venue for the envisaged visitor and heritage conservation centre.

(121) Schloss Raesfeld: <http://www.akademie-des-handwerks.de/> (26.04.2014)

(122) <http://www.denkmalpflege-trebsen.de/> (26.04.2014)

(123) Kartause Mauerbach, <http://www.bda.at/organisation/1439> (26.04.2014)

(124) <http://www.denkmalakademie.de/> (26.04.2013)

(125) The centre's interpretive signs can be found in: Klotz-Warischner, Gerhard: Zur Ausstellung, in: *Handwerk und Denkmalpflege. Die Zukunft des baulichen Erbes im Alpenraum, Inhalte – Projekte – Dokumentationen*, Schriftenreihe des Bayerischen Landesamtes für Denkmalpflege Nr. 1, München 2010, pp. 112 ff.

(126) A list of current Bauarchiv courses is available at http://www.blfd.bayern.de/bau-und_kunstdenkmalpflege/bauarchiv/infos/index.php (06.03.2014)

(127) A company called Remmers, for example; see: <http://www.remmers.de/4402.0.html> (27.05.2014)

8 The White City cooperation network

The myriad local and international efforts to preserve the White City need to be networked, so as to allow the benefits of the various initiatives to be put to optimal use. Members of this network need to be aware of each others' existence, know each other personally, and learn from each other.

The impetus for establishing such a network cannot be imposed on citizens of Tel Aviv from the outside, but instead needs to come from the city of Tel Aviv itself. For a network is not an entity that exists solely for its own purposes or that generates impetus under its own steam. Already some years ago, the will existed in Tel Aviv to protect the White City's unique buildings and ensembles as a World Heritage Site. Hence a primary goal here should be to establish and maintain the structures necessary for this purpose. To this end, the existing German-Israeli website¹²⁸ should be appropriated, expanded, and enlivened. In practical terms, this will involve not only establishing contact, but also carrying out PR in all of the relevant spheres. This can be accomplished locally through lectures, courses and articles in the media – and internationally through events such as conferences, workshops, symposiums and the like.

If this will is clearly conveyed by the city of Tel Aviv, its inhabitants will learn a great deal worth knowing that they didn't know before, concerning the historic buildings that they reside in. The residents of the White City will see these buildings in a new light, will use them henceforth with pride, and thus will also want to preserve them. There are many such networks around the world that strengthen the conservation of local historic objects by raising consciousness at the local level. But such networks only work if they are supported and participated in by a broad swathe of the general public. For this in turn results in exchanges that effortlessly build both domestic and international bridges, and that convey the desired information and attract the requisite experts.

The relatively recently founded German-Israeli White City Cooperation network of Tel Aviv will help, in this regard, to strengthen existing ties and forge new ones in the international sphere. The Ger-

man members of this network can avail themselves of a number of thematically suitable entities as examples, which will now be described.

8.1 Associations and working groups

In our view, the associations and working groups referred to below, all of whose activities centre around heritage values, information and teaching activities and practical conservation of heritage objects, would be highly beneficial for the Tel Aviv White City cooperation network.

8.1.1 *Arbeitskreis Theorie und Lehre der Denkmalpflege e. V.*

The Arbeitskreis Theorie und Lehre der Denkmalpflege¹²⁹ is a platform for experience sharing and professional activity among experts and scientists from Germany, Austria, Switzerland, Luxembourg, Italy, The Netherlands, the UK, Belgium, Slovakia, Croatia and Romania.

This working group could be used as an international forum to discuss the historic and formal aspects, as well as the materials, structural and architectural elements and colours, of Israeli historic buildings. Of particular importance here would be expanding the scope of Tel Aviv's focus beyond the restrictive term Bauhaus, so as to also take into account historic international collaboration via the Werkbund and the architecture schools of the 1920s and 1930s.

"Kulturerbe als transkulturelles Soziefakt: Territorium, Migration und Identität" (Cultural heritage as a cross-cultural socio-fact: territory, migration and identity) was the theme of a section of a conference that was held on 30 September 2011 in Heidelberg. The topics touched upon included the following: cultural legacy as a trans-cultural construct, from Temesvar to Mostar (Gabi Dolff-Bohnekämper, TU Berlin); the German cultural legacy in Namibia (Andreas Vogt, Windhuk, Namibia); the German architectural legacy in Tsingtau (Gert Kaster, Quingdao, China). In 2009, the theme of the conference was the evalua-

(128) <http://www.netzwerk-weisse-stadt.de/> (27.05.2014)

(129) www.uni-weimar.de/de/architektur/professuren/denkmalpflege-und-baugeschichte/arbeitskreis/kontakt/ (22.4.2014)

tion of cultural landscapes. The most recent conference, in 2013, addressed the issue of assessing the value of heritage objects.

The working group's mission is to further the interests of heritage conservation professionals, and to this end the group is a member of the German National Commission for Heritage Conservation (DNK). The working group's homepage contains conference reports, bibliographies, and conference proceedings, as well as articles on current issues, projects and the like. The homepage is part of the Bauhaus-Universität Weimar's Institut für Denkmalpflege und Baugeschichte (Department of heritage conservation and construction history) website.

8.1.2 *Vereinigung der Landesdenkmalpfleger der Bundesrepublik Deutschland (VDL)*

Another network that the White City cooperation network could interface with is Vereinigung der Landesdenkmalpfleger (VDL),¹³⁰ which was founded in 1951 under the aegis of the Kultusministerkonferenz (culture-ministers' conference). This network, which provides a platform for nationwide coordination by heritage officials concerning conservation issues, offers extensive informational material on a range of topics. The list of publications of VDL working groups provides heritage object owners, heritage officials, and members of the public with clearly formulated recommendations and guidelines concerning construction and conservation practices for historic buildings. In 2013, the association issued a manual that is the first such publication to provide a comprehensive and systematic compendium on urban development and heritage conservation matters. The manual also describes the relevant legal frameworks, as well as heritage object identification and documentation methods.¹³¹

In our view, the VDL working groups on the following topics are relevant for the White City cooperation network: research on historic buildings; construction techniques; inventorying; restoration; urban heritage and historic garden conservation. These working groups have issued recommendations concerning standards and re-

quirements for heritage object research, conservation and energy efficiency upgrading. These recommendations are available as PDF documents, in German only.¹³²

The VDL working groups create exhibits and informational brochures on various heritage conservation topics, for the denkmal Leipzig trade show. These exhibits are realized as portable signs and can be booked. The following exhibits are relevant for the White City:

- "Maßgeschneidert – energetische Ertüchtigung von Baudenkmalen" (2012)
- "Denkmal an Beton" (2008);
- "Von der Spurensuche zur praktischen Anwendung: Historische Bau-forschung in der Denkmalpflege" (2004).

Brochures are available for these exhibits.¹³³ A presentation in the envisaged visitor and heritage conservation centre could provide useful impetus for exchanges within the White City cooperation network.

8.1.3 *Wissenschaftlich-Technische Arbeitsgemeinschaft für Bauwerkserhaltung und Denkmalpflege e. V. (WTA)*

*"The international WTA e.V. association aims to promote research and the practical application thereof to object conservation. One of the association's main tasks in this regard is making past experience useful to practitioners, so as to expedite the application of new knowledge and modern technologies. To this end, the association strives to promote extensive dialogue between scientists and practitioners."*¹³⁴

The WTA comprises eight departments, the Concrete department being the most relevant for the White City cooperation network. In 2013, the department held a symposium on the current state of the art of concrete maintenance.¹³⁵

The WTA's eight departments also elaborate standards and procedures for heritage building restoration and for the rehabilitation of historic structural fabrics. WTA data sheets (Merkblätter) are available to all interested parties for a moderate charge.¹³⁶

(130) <http://www.denkmalpflege-forum.de> (23.04.2014)

(131) Eidloth, Volker; Ongyert, Gerhard; Walgern, Heinrich (Hrsg.): Handbuch städtebauliche Denkmalpflege. Berichte zu Forschung und Praxis der Denkmalpflege in Deutschland 17, Petersberg 2013

(132) <http://www.denkmalpflege-forum.de/Veroeffentlichungen/veroeffentlichungen.html> (27.05.2014)

(133) http://www.denkmalpflege-forum.de/--_Ausstellungen/--_ausstellungen.html (23.04.2014)

(134) <http://www.wta.de/de> (27.05.2014) Translated from German

(135) <http://www.wta.de/de/referate/referat-5#veranstaltungen> (27.05.2014)

(136) <http://www.wta.de/de/wta-merkblaetter> (27.05.2014)

8.1.4 *Koordinierungsstelle für Energieberater am Baudenkmal*

The Koordinierungsstelle für Energieberater am Baudenkmal¹³⁷ (coordination centre for energy consultancy) was established jointly by the WTA and VDL, because the conventional methods for upgrading building energy efficiency cannot be fully transposed to heritage buildings.

The Koordinierungsstelle has adopted a strategy involving the training of experts, rather than issuing standards, guidelines or the like, whose use in actual practice can in any case never be enforced. Hence the Koordinierungsstelle was established in light of (and in response to) the fact that since 1 April 2012, Kreditanstalt für Wiederaufbau (KfW) funding of building energy efficiency upgrading is also awarded in accordance with the "KfW-Effizienzhaus Denkmal" funding standard, which is specifically aimed at historic buildings in need/worthy of conservation. The KfW standard centres around quality assurance through expert planning and work site supervision; whereby the "Sachverständige Energieberater für Baudenkmale und sonstige besonders erhaltenswerte Bausubstanz für die KfW-Programme zur energetischen Sanierung" (aka "Energieberater für Baudenkmale," i.e. accredited energy consultant) is a mandatory partner for the funding of heritage building energy efficiency upgrading projects.

In the interest of upgrading the energy efficiency of White City buildings, we strongly recommend that regular exchanges be conducted between the (putative) White City cooperation network and the Koordinierungsstelle.

8.1.5 *Verband der Restauratoren (VDR); der Zentralverband des Handwerks (ZDH)*

Germany has around 4,000 restorers who have entered this career via a large variety of training pathways. Most of today's restorers have a college degree and practice their trade on actual objects, or do research on or planning for putative objects. As a rule, German restorers are not generalists, but instead specialize in one or more types of objects or materials. Hence heritage object restorers usually specialize in murals

or historic elements made of stone or wood.

Many of these restorers are represented in Germany by Berufsverband VDR e.V.¹³⁸ Because Germany lacks a uniform law protecting the occupational designation "restorer," the VDR has adopted its own professional-training standards, and is now in charge of such training.

A similar association known as Restaurator im Handwerk e.V., which is under the aegis of the Zentralverband des Handwerks, has around 330 members, who are members of the building trades who work as restorers.¹³⁹

These organizations are indicative of the fact that in Germany, restorers (who are trained in various ways) are highly specialized, whether it be in research, investigations, planning, or the realization of actual restoration activities. This has resulted in the establishment of protocols in the German heritage conservation sector that were more the exception than the rule just three decades ago.

The widespread and systematic training of restorers in Germany since the 1980s has substantially altered the quality of restoration and conservation work in Germany. In the past, if a restoration project achieved a successful outcome by today's standards, it was thanks to the efforts of a handful of highly dedicated individuals; whereas today most restoration projects have a successful outcome. In other words, it's safe to say that good quality is only achievable if a sizeable corps of well trained specialists is available.

In view of the lack of Israeli training programs for restorers, we feel that such exchanges and qualified training is indispensable and should be extensive; for without them it will simply not be possible to sustainably preserve White City buildings in line with international standards.

8.2 Cooperation in the academic and practitioners' realms

For many years now, Israeli academics and German partners have cooperated on heritage restoration projects. Many such collaborations have been made possible by

(137) <http://www.energieberater-denkmal.de/> (27.05.2014)

(138) <http://restauratoren.de/startseite.html> (09.05.2014)

(139) <http://www.restaurator-im-handwerk.org/mitglieder2013/addresses/index/gewerk:4> (09.05.2014)

personal relations, which have been maintained thanks to exchange programs between German and Israeli universities. Haifa University has numerous smoothly functioning academic exchange programs with German universities. The key partners in this regard are the following institutions:

8.2.1 *Bucerius Institute for Research of Contemporary German History and Architecture, in Haifa*

The focus of the collaboration realized by the ZEIT Foundation's Bucerius Institute for Research of Contemporary German History and Architecture is on social-science and historical topics. Nonetheless, this cooperation program could also be profitably incorporated into the White City cooperation network, and, via its stakeholders, would allow for networking in connection with historic architecture and heritage conservation topics. For example, the architect and city planner Gil Gordon delivered a lecture at the Bucerius Institute in 2012 titled "About the Conservation Work of the Schneller Compound in Jerusalem."¹⁴⁰ We recommend that the Bucerius Institute be solicited as a possible cooperation partner.

8.2.2 *Leo Baeck Institute Jerusalem for the Study of German and Central European Jewry*

The Leo Baeck Institute Jerusalem for the Study of German and Central European Jewry has for many years maintained a research network centreing around cultural issues that would be well worth studying in connection with the research activities at the envisaged White City visitor and heritage conservation centre.¹⁴¹

8.2.3 *Bet Tfila at Technische Universität Braunschweig*

The international and interdisciplinary Bet Tfila – Research Unit for Jewish Architecture in Europe oversees documentation and research projects, which currently centre around buildings used for religious purposes, as well as community appurtenances. Bet Tfila is currently in the process of establishing a database, which will be incorporated into the Jerusalem Index of Jewish Art - Section Architecture of Jewish Monuments and Sites. Bet Tfila currently

supports a number of publications and courses as part of its network of students and grant recipients. Bet Tfila also holds travelling exhibitions, and has a collection of architectural models that was begun in the 1990s. In Germany, Bet Tfila is part of the Braunschweig Technical University Department of Construction History.

- Bet Tfila – Forschungsstelle für jüdische Architektur in Europa
TU Braunschweig, Pockelsstr. 4
D-38106 Braunschweig
- Bet Tfila – Research Unit for Jewish Architecture in Europe
Center for Jewish Art, Mount Scopus,
Humanities Object
Jerusalem, 91905
Israel

The close ties between Braunschweig Technical University academics and Israel are also evidenced by the latest publication of Karin Wilhelms, at Institut Geschichte und Theorie der Stadt, whose website¹⁴² lists publications on this topic. For example, "Neue Städte für einen Neuen Staat" (2013)¹⁴³ discusses the similarities and differences between urban planning in Germany and Israel.

8.2.4 *Gesellschaft zur Erforschung des Lebens und Wirkens deutschsprachiger jüdischer Architekten*

The Berlin-based association known as Gesellschaft zur Erforschung des Lebens und Wirkens deutschsprachiger jüdischer Architekten has been active internationally since the 1990s. The association organizes guided tours of Berlin that bring to light suppressed and buried knowledge about Jewish architects who left behind significant buildings in Germany.

The association's activities, which are described on its website,¹⁴⁴ focus in particular on the published writings of Myra Warhaftig on this topic. The website is linked to Pentagon Papers, which is an online magazine about prominent architects.

The association works with the following entities (among others) in connection with its events and exhibitions: the Deutsches Historisches Museum in Berlin; Berlin's

(140) Announcement concerning the presentation available on the website of the Bucerius Institute for Research of Contemporary German History and Society; <http://bucerius.haifa.ac.il/gordon.html> (11.02.2014)

(141) See <http://en.leobaeck.org/Profile/> (12.02.2014)

(142) <http://www.gtas-braunschweig.de/> (28.04.2014)

(143) Authors: Eliezer Ben-Rafael, Meron Benvenisti, Jörn Düwel, Zvi Efrat, Toni Föllmi, Rachel Kallus, Ruth Kark, Anna Minta, Willi Oberkrome, Martin Peschken, Bertram Schefold, Axel Schildt, Julius Schoeps and Andreas Nachama, Korinna Schönhärl, Yaakov Sharett, Thomas Sieverts, Joachim Trezib, Stefan Vogt, Georg Wagner-Kyora, Karin Wilhelm, Joachim Wolschke-Bulmahn and Moshe Zuckermann.

(144) <http://www.juedische-architekten.de/index.htm> (29.04.2014)

Jewish community; the Goethe-Institut in Tel Aviv; the Schussheim Foundation Haifa; Hochschule Anhalt; Akademie der Künste in Berlin; chambers of architects.¹⁴⁵

8.2.5 Bauhaus-Universität Weimar

The Bauhaus-Universität Weimar architecture department¹⁴⁶ has ties with Jerusalem's Bezalel University. For example, during the 2013-2014 winter semester the architecture department organized (among other things) a study trip to Israel on the theory and history of modernist architecture, for which the participants prepared via a course.

Bauhaus-Universität Weimar is a member of the White City cooperation network. The university's department of Heritage Conservation and Construction History (among others) is extremely interested in continuing this relationship. The chair, Hans Rudolf Meier, is also head of the Verein Theorie und Lehre in der Denkmalpflege (heritage conservation theory and pedagogy association).

8.2.6 A selected list of experts and institutions in the field of architecture and heritage conservation that are specialized in this field

The following experts are members of the BMUB consultants' network:

- Winfried Brenne (Berlin)
- Dr. Thomas Danzl (HBK Dresden)
- Monika Markgraf (Stiftung Bauhaus Dessau)
- Dr. Regina Stephan (Mainz)

In our view, the following individuals (among others) could also profitably be incorporated into the White City cooperation network:

- Dr. Jakob Eisler (Universität Stuttgart)
- Professor Zvi Evrat (Tel Aviv)

- Dr. Ita Heinze-Greenberg (ETH Zürich)
- Dr. Micha Gross (Bauhaus centre Tel Aviv)
- Professor Gilbert Herbert (Technion Haifa)
- Dr. Annemarie Jaeggi (Bauhaus Archiv Berlin)
- Dr. Ulrich Knufinke (TU Braunschweig)
- Dr. Nitza Metzger-Smuk (Technion Haifa)
- Dr. Wilhelm Simson (Munich)
- Dr. Ingrid Scheurmann (TU Dortmund, Deutsche Stiftung Denkmalschutz Bonn)
- Dr. Andreas Schwarting (Universität Konstanz)
- Dr. Ada Vittorina Segre (Technion Haifa)
- Dr. Ines Sonder (Potsdam-Berlin)
- Dr. Jos Tomlow (Hochschule Zittau)
- Dr. Karin Wilhelm (TU Braunschweig)

In their capacity as experts in the field of culture and education, the following individuals and the foundations they have established are worthy of mention here:

- Stef Wertheimer (Israel), who is one of the leading advocates of structured professional training
- Ronald Lauder (USA), founder and patron of the Bauhaus Museum in Tel Aviv

In addition, the scope of the existing contacts between the following entities for the network should be expanded:

- ICOMOS Deutschland and ICOMOS Israel
- Delegates to the "Greening The White City" conference, which was held in Tel Aviv in May 2013

(145) See „Archiv“ on this homepage: <http://www.juedische-architekten.de/archiv/archiv2007.pdf> (29.04.2014)

(146) <http://www.uni-weimar.de/de/architektur-und-urbanistik/professuren/architekturtheorie> (24.03.2014)

- Docomomo, with its existing contacts
- Deutsch-Israelische Gesellschaft
- The relevant departments at the universities in Tel Aviv (TAU), Haifa (Technion) and Jerusalem (Bezalel)
- The relevant departments at German universities

8.3 Foundations

The foundations that mainly come into play here are those that already have at least informal ties with the Tel Aviv Conservation Team and the White City cooperation network – particularly the Tel Aviv-Yafo Foundation and the Heinrich Böll Foundation. The decision as to whether German foundations that are currently active in Israel should be contacted needs to be investigated further.

8.3.1 *Wüstenrot Stiftung*

As a Bausparkasse (building society) foundation, the *Wüstenrot Stiftung*¹⁴⁷ is strongly committed to the conservation of historic buildings. The funding of restoration of modernist heritage buildings and the foundation's professional exchange program would lend themselves extremely well to cooperation with the White City cooperation network. The foundation could potentially set up the German arm of a partner program for in-service training on construction techniques for early modernist buildings, and could incorporate current German heritage conservation standards into a joint pilot project.

Over the years, the foundation has displayed exceptional commitment to the professional discourse on heritage conservation. In cooperation with various universities, offices of heritage conservation, and organizations, it has helped fund the rehabilitation of outstanding heritage buildings, including modernist buildings. The foundation has funded research on the cultural significance of heritage objects, detailed inventorying of such objects, structural-fabric studies, the formulation of heritage conservation goals, and elaboration of a list of heritage conservation measures. The foundation has also clearly identified the timeline, financial and organizational conditions for heritage conservation measures.

These activities have yielded exemplary rehabilitation outcomes and reports on these outcomes in the literature. The foundation very proactively supports high-impact gatherings such as the 2014 conference (titled "Denkmal Ost-Moderne II") on the conservation of currently undervalued historic postwar buildings, which was held at Bauhaus-Universität Weimar,¹⁴⁸ as well as the (likewise 2014) "Baukultur der Nachkriegsmoderne" symposium, which was held at Hochschule für Technik in Stuttgart.

8.3.2 *DenkmalAkademie at Deutsche Stiftung Denkmalschutz*

Founded in 2001, the German professional training institution known as *DenkmalAkademie* has since 2012 been part of the *Deutsche Stiftung Denkmalschutz* (German heritage protection foundation). In the 14 years since its founding, the *DenkmalAkademie* has trained an extensive network comprising experts, non-professionals and property owners who are passionate about heritage conservation.¹⁴⁹

DenkmalAkademie organizes courses, workshops, and conferences at various venues for heritage-object owners, interested non-professionals, members of the building trades, architects, construction researchers, and college students. The *DenkmalAkademie's* extensive program also includes training on legal matters and provides participants with practical recommendations. Training topics include upkeep of furnishings and other historic elements, as well as the upkeep of historic gardens. The core element of *DenkmalAkademie's* professional training events is its heritage conservation training course, which covers the legal, historical and technical fundamentals of conservation. HOAI payments fees, as well as usage and marketing strategies are also covered. The various training programs take the form of week-long practical sessions and classes on restoration, construction measures, construction research, building deterioration, building climatology, energy saving, and energy efficiency upgrading.

A course was held in January 2014 in Frankfurt on reducing energy use in postwar modernist buildings. Another course, in February 2014, covered materials science, fire safety, building climatology, and

(147) <http://www.wuestenrot-stiftung.de> (28.4.2014)

(148) The conference was widely covered in the media and online; see www.uni-weimar.de/de/architektur/professuren/denkmalpflege-und-baugeschichte/professur/denkmal-ost-moderne/ (23.04.2014)

(149) <http://www.denkmalakademie.de> (27.05.2014)

energy saving. The course also covered topics such as wheelchair accessibility, historic road paving, reconstruction, and conservation of factories and gardens and grounds.¹⁵⁰

Participants in these courses will be able to impart the methods and approaches they have learned to others. Inasmuch as a college degree is a prerequisite for attending these courses, members of the building trades are not admitted. Hence building-trades restorers should be allowed to attend these courses as well, as they would also provide considerable impetus for historically accurate heritage conservation.

The courses are recognized as training measures by some chambers of architects.

8.3.3 *Axel Springer Stiftung*

We recommend that grants for German students doing their initial training to study in Tel Aviv be obtained from the Axel Springer Foundation.¹⁵¹ These scholarship recipients could later become key members of the network.

8.3.4 *Product and technology platforms*

During our stay in Tel Aviv, we realized that members of the Israeli heritage conservation community are greatly interested in doing business with German companies. Germany has a broad spectrum of mid-sized companies, as well as a number of construction sector actors, that are very interested in marketing their heritage conservation products in Israel. It would therefore make sense to facilitate the requisite contacts by holding a heritage conservation trade show in Israel. There are two such worthwhile events in Europe that could serve as models for an Israeli heritage conservation trade show. These shows will now be described.

8.3.5 *denkmal Leipzig*

This event, under the auspices of UNESCO, is held every two years. According to information provided by the organizers, the edition 2012 featured 459 exhibitors from 14 countries, and 13,600 visitors from 37 countries. The show had exhibits and ex-

hibitors in an extremely broad range of areas.¹⁵²

The most recent edition of denkmal Leipzig trade show, which was held from 6-8 November 2014, centred around historic facades. As in past years, there were also numerous exhibitors that specialize in modern construction materials and also offer historically adequate construction materials, as well as energy-efficiency upgrading. In the context of cooperation among experts concerning the project described here, Israeli representatives, BMUB staff, and the authors of this report visited the show together, on which occasion they had the opportunity to make a presentation concerning the cooperation network.

In addition, each edition of denkmal Leipzig has a designated partner country, which in 2014 was Norway. It would be a good idea to try to make Israel the partner country for 2016 – which would also provide an additional platform for the White City.

Furthermore, the show's Denkmalbrief newsletter and online "News" rubric could potentially provide current information concerning the White City cooperation network. This would allow for the formulation of very concrete questions.

In keeping with the Federal Ministry for Economic Affairs and Energy's policy of supporting the participation of innovative startups in the trade show, the ministry sponsors a stand for innovative startups called Gemeinschaftsstand Junge innovative Unternehmen.¹⁵³ Long term relationships could potentially be formed with such companies within the network.

The 2014 edition also featured a so called Messeakademie, whose theme was "What do we really mean by "old?" Historic districts for the future." The Messeakademie – which is a Germany-wide architecture competition for college architecture and construction engineering majors – could potentially provide impetus for activities in Tel Aviv. The purpose of the competition was to encourage the participating students to take a sensitive and sustainable approach to the structural fabric of historic buildings, by devising exemplary solutions for the designated objects. The objects in question were selected in collaboration with regional-state offices of heritage con-

(150) <http://www.denkmalakademie.de/10-02-14-WS-4-besond.2046.0.html> (15.01.2014)

(151) http://www.axelspringerstiftung.de/AS-Stiftung_Zweck_neu.pdf (28.04.2014)

(152) <http://www.denkmal-leipzig.de> (06.02.2014)

(153) <http://www.denkmal-leipzig.de/Aussteller/Profil/JungeUnternehmen/> (06.02.2014)

servation, Förderverein für Handwerk und Denkmalpflege e.V. Rittergut Trebsenn and DKB Stiftung für gesellschaftliches Engagement. The best solutions will be published, via financial support from the Deutsche Stiftung Denkmalschutz.¹⁵⁴

An excellent way for Israeli stakeholders to forge close ties with German heritage conservation companies and products is for these stakeholders to attend the denkmal Leipzig trade show – and if possible see to it that Israel is the partner country for the event.

8.3.6 Denkmal Moscow

In 2011, Leipziger Messe became the organizer and sponsor of the denkmal Moscow trade show.¹⁵⁵ Moscow has around 4,000 listed buildings, a third of which are in need of restoration – a backlog comparable to that in Tel Aviv. Around 20 percent of renovation projects carried out in Moscow are financed by private investors. The aim of the event is to (a) raise awareness of the importance of historically accurate rehabilitation, including in the face of the enormous pressures entailed by the Moscow conurbation; and (b) promote increasing realization of rehabilitation projects in Moscow in accordance with international standards, as has already been done with the Bolshoi Theatre and other prominent projects.

The second edition of the denkmal Moscow trade show, in October 2013, featured a wealth of German companies, restorers and manufacturers.¹⁵⁶ The event was supported by the Department of Cultural heritage of the City of Moscow, the Ministry of Culture of the Russian Federation, the Association of Russian Conservators, ICOM and other entities.

8.3.7 Monumento Salzburg

The theme of the second edition of the Monumento Salzburg heritage conservation trade show, in 2014, was as follows:

“The right material can lend atmosphere to a monument, can bring life to its surface and create a play of light and shadows, which has an immediate effect on the beholder.”¹⁵⁷

The Monumento Salzburg trade show aims to create international networks for heritage conservation and rehabilitation – a goal that is also clearly evidenced by the international make up of the event’s advisory board. Monumento, which is also one of the world’s largest heritage conservation trade shows, provides online lists of international suppliers, experts and specialized companies. The event features presentations, whose presenters during the 2014 edition included delegates from the Bavarian state office for heritage conservation, as well as manufacturers and restoration providers.¹⁵⁸

One of the main presentations was that given by a delegate from the Austrian office for heritage conservation Bernd Euler-Rolle, titled “Die neuen Standards der Baudenkmalpflege - Leitlinien und Grundsätze für die Praxis,” (New heritage conservation standards: guidelines and principles for everyday practice). In his presentation, Euler-Rolle discussed matters such as object inventorying and condition surveys, and the ways in which objects can be altered, given the available construction and technical options. In Euler-Rolle’s view, such standards should be used as a matrix for heritage conservation processes and assessments in Austria, as they would ease the decision making and communication tasks entailed by object conservation.

8.3.8 A heritage conservation trade show for Tel Aviv?

The trade shows described above are excellent examples of international cooperation on the part of offices for heritage conservation, professional associations, manufacturers, and networks of experts.

Such cooperation could also be promoted by the White City cooperation network and could potentially be supported by the German-Israeli Chamber of Commerce and Industry, with whose president, Grisha Arloi-Arloser we met on 8 October 2013. During this meeting, he indicated to us that it would be possible to seek out suitable German heritage conservation and energy upgrading companies that are interested in marketing their products and services in Israel. The German-Israeli Chamber of Commerce and Industry helps German companies to find customers in Israel, provides advice to German companies inter-

(154) http://www.denkmal-leipzig.de/media/pdf/FLYER_MESSEAKADEMIE_2014.pdf (06.02.2014)

(155) [http://lemmon.leipziger-messe.de/LeMMon/Graph1.NSF/Lookup/Ausstelliste%20dt/\\$file/Ausstelliste%20dt.pdf](http://lemmon.leipziger-messe.de/LeMMon/Graph1.NSF/Lookup/Ausstelliste%20dt/$file/Ausstelliste%20dt.pdf) (29.04.2014)

(156) A list of the most frequently used German vendors for trade shows in Moscow can be found at <http://www.denkmal-moskau.de/>, linked here to: [http://lemmon.leipziger-messe.de/LeMMon/Graph1.NSF/Lookup/Ausstelliste%20dt/\\$file/Ausstelliste%20dt.pdf](http://lemmon.leipziger-messe.de/LeMMon/Graph1.NSF/Lookup/Ausstelliste%20dt/$file/Ausstelliste%20dt.pdf) (06.02.2014).

(157) http://www.monumento-salzburg.at/tl_files/media/monumento/Monumento-Messekatalog.pdf (06.02.2014)

(158) For a list of presenters and exhibitors, see http://www.monumento-salzburg.at/tl_files/media/monumento/Monumento-Messekatalog.pdf (06.02.2014)

ested in opening a branch in Israel, helps with searches for marketing, research, investment and building development services, and sponsors interdisciplinary workshops and intercultural training courses. The website of Deutsch-Israelische-Wirtschaftsvereinigung e.V. (D-I-W) explicitly refers to these goals, under the "network" rubric: "(...) [N]ew committees are in the pipeline in areas such as renewable energy and sustainability," which fall within the scope of a heritage conservation trade show.¹⁵⁹ During our visit to Israel, Mr. Alroi-Arloser expressed openness to the idea of a heritage conservation trade show in Israel in the form of, as he put it, "a small show with around seven selected exhibitors." D-I-W could, along the lines of the German-Israeli Life Sciences Committee (GILSC),¹⁶⁰ organize a small heritage conservation trade show for companies and organizations, with the goal of promoting commercial activity between the relevant Israeli and German companies.¹⁶¹

(159) <http://www.d-i-w.de/netzwerk/> (06.02.2014)

(160) <http://www.d-i-w.de/netzwerk/gilsc/> (18.09.2014)

(161) <http://www.gilsc.org/> (06.02.2014)

8.3.9 A list of selected vendors of heritage conservation materials and tools

Following is a list of selected vendors that are particularly relevant for heritage conservation in the White City. For further information, see the list of denkmal Leipzig exhibitors (available online)

- Silicate paint
Keimfarben GmbH
Keimstraße 16
86420 Diedorf
Tel.: +49-821-802-0
<http://www.keimfarben.de>
- Lime paint
(dispersed white lime hydrate)
Kalk Kontor GmbH
Mülheimer Str. 26, Tor 3, Geb. 346
53840 Troisdorf
Tel.: +49-2241-251 9955
<http://calxnova.de>
- Lime mortar, Tubag NHL mortar
quick-mix Gruppe GmbH & Co. KG
Mühlenschweg 6
D-49090 Osnabrück
Tel.: +49-541-601-01
<http://www.tubag.de/de/sanieren-und-restaurieren.html>
- Lime mortar, Knauf Rotkalk
Knauf Gips KG
Am Bahnhof 7
97346 Iphofen
Tel.: +49-9323-31-0
<http://www.knauf.de/profi/sortiment/pr-odukte/rotkalk-grund-2.html>
- All restoration materials, tools and supplies
Deffner & Johann GmbH
Mühläcker Straße 13
D-97520 Röhlein
Phone: +49-9723-9350-0
<http://www.deffner-johann.de>
- Restoration materials; historic pigments and binders
Kremer Pigmente GmbH & Co. KG
Hauptstr. 41 – 47
D-88317 Aichstetten
Tel. +49-7565-914480
<http://www.kremer-pigmente.com>

- Facade paint strippers; develops CFC-free, low solvent paint strippers
Scheidel GmbH & Co. KG
Jahnstraße 38–42
96114 Hirschaid
Phone: +49-9543-8426-0
<http://www.scheidel.com>
- Spray equipment; develops special low pressure sprayers for heritage conservation use
Schmidt Sandstrahltechnik GmbH
Oberdorfstraße 6
91747 Westheim
Tel.: +49-9082-96 80-0
<http://www.Schmidt-Sandstrahltechnik.de>
- Steel frame windows; the company replicated historic profiles for the Bauhaus Dessau Foundation
MHB bv
Onderstalstraat 3
NL-6674 ME Herveld
Tel: +31-488-471500
<http://www.mhb.nl>
- Steel frame windows; develops thermally isolated steel elements with minimized face widths
Schüco International KG (Schüco-Jansen)
Karolinenstraße 1–15
33609 Bielefeld
<http://www.schueco.com>

8.3.10 Selected vendors of energy upgrading materials and equipment

- **Gesamtverband Dämmstoffindustrie** (GDI)
Friedrichstraße 95 (PB 138)
10117 Berlin
<http://www.gdi-daemmstoffe.de>
- **SolarWorld AG**
(photovoltaic solar energy)
Martin-Luther-King-Str. 24
53175 Bonn
www.solarworld.de
- **FLACHGLAS Wernberg GmbH**
Nürnberger Straße 140
92533 Wernberg-Köblitz
<http://www.flachglas.de>
- **Interpane Glas Industrie AG**
Sohnreystraße 21,
37697 Lauenförde
<http://www.interpane.de>
- **Bundesverband Solarwirtschaft e.V.** (BSW)
Quartier 207, Friedrichstr. 78
10117 Berlin
<http://www.solarwirtschaft.de>
- **Bundesverband Wärmepumpe** (BWP) e. V.
Französische Straße 47
10117 Berlin
<http://www.waermepumpe.de>
- **SorTech AG** Thermal cooling;
adsorption refrigeration apparatuses
Zscherbener Landstraße 17
06126 Halle (Saale)
<http://www.sortech.de>
- **Bundesverband Rollläden + Sonnenschutz** e. V.
Hopmannstraße 2
53177 Bonn
www.rs-fachverband.de
- **Deutscher Ausschuss für Stahlbeton** e. V.
Budapester Straße 31
10787 Berlin
<http://www.dafstb.de>

9 The urban historical context and the Templer settlements

In light of the envisaged establishment of a German-Israeli heritage conservation network, in this section we discuss the construction history-related local ties to Germany that predated the establishment of the White City, but whose architectural history context is little known – at least in Germany.

9.1 The founding of Tel Aviv

Tel Aviv was founded just outside Jaffa in 1909 as a 60-family garden city called Ahusad Baid, with one main street with quiet side streets branching off it. Already extant at this site at the time were the settlements of Neve Tsedek and Neve Shalom (founded in the late 19th century), the Templer (Pietist movement) settlements of Valhalla and Sarona, and an Arabic Muslim settlement called Mansiyeh.

These settlements, which until 1939 were part of Jaffa and are now located in downtown Tel Aviv, are represented merely by anonymous white dots on the Geddes plan, without their names actually appear-

ing on the plan. These settlements not being marked in the Geddes plan, and the street renaming that was realized later on for political reasons resulted in their being to all intents and purposes erased from the annals of history.¹⁶²

Many of the historic buildings in these settlements were salvaged in the 1990s, through the efforts of the Tel Aviv Conservation Team. But as one author has noted,¹⁶³ for reasons related to heritage conservation selection criteria and social acceptance, it is apparently not always easy for such buildings to be granted the same heritage conservation attention as the buildings in the Jewish quarters of Tel Aviv. But since 2005, this has no longer been the case.

Following the rehabilitation of these buildings, which in some cases also involved the replacement of building elements, materials and surfaces that could have been repaired, the historical accuracy of these buildings was to some extent greatly reduced. Modernist deformations of the ex-

(162) Bayerische Luftabwehr (Bavarian air defense) aerial photos can be found at the Kriegsarchiv der Bayerischen Staatsbibliothek München, Universität Greifswald and elsewhere. See Dalman, Gustav: Hundert deutsche Fliegerbilder aus Palästina. Ausgewählt und erläutert von Dr. Gustav Dalman, Prof. in Greifswald aus dem Bildbestand des Bayer. Kriegsarchivs, mit genauem Kartenblatt. – Greifswald 1925

(163) Personal communication from Jakob Eisler, in 2014.



Figure 104: Historic White City building near Pinsker Street in Tel Aviv (2013)



Figure 105: Former Jaffa train station building following its conversion into a restaurant in 2013. This building was at one time closely connected to the grounds of a Templar company (Wieland Compound).

terior appurtenances of these buildings played a major role in this regard.

Like the extant historic Arabic settlement buildings, these 19th century buildings are relevant in the context of a German-Israeli network and the envisaged visitor and heritage conservation centre. This network could help to fill the gaps in our knowledge on matters such as construction methods, materials and building elements – to name but a few. Inventorying of historic buildings and archived materials could shed light on the heritage conservation value of the extant buildings in terms of settlement and urban history, contacts between German and Israeli architects and building contractors, and structural design. For in point of fact, glass, iron and concrete were used in Palestine settlements almost from the beginning, and were commonly used by settlers in Palestine, along with traditional construction materials, long before the advent of the White City.¹⁶⁴

9.2 The Templar settlements

Jakob Eisler has for a number of years now been researching the history of the Templers (Pietist 19th century German settlers)

in Tel Aviv, using archival materials such as documents, plans, and photographs from the Landeskirchliches Archiv Stuttgart.

Following the collapse of an initial settlement on Mount Hope in the 1850s, in 1866 an American settlement was established near the beach, in front of the Jaffa city walls. In 1869 German Templers took over these buildings, which were (and are still today) known as The American Colony. A hotel, businesses, and a church (St. Immanuel, 1904) soon sprung up here. Upon opening of the Jerusalem-Jaffa railroad line in 1892, the Templers founded an additional colony called Valhalla, which was manufacturing oriented.

On the other side of the train tracks, only a few hundred meters away, the settlements of Neve Tsedek (1887) and Neve Shalom (1890) had been established.

In 1909 the garden city of Ahuzad Bayid was founded, likewise on the other (northern) side of the tracks. These settlements were located only a stone's throw away from an older Arabic settlement known as Mansiyeh, which was likewise just outside the Jaffa walls, behind the train station.

(164) Goldman, Dan: *The Architecture of the Templars in their Colonies in Eretz-Israel, 1868-1948, and their Settlements in the United States, 1860—1925.* – Cincinnati, Ohio (Diss.) 2003, p. 64. Goldman frequently cites Jakob Eisler in connection with Tel Aviv-Jaffa: *Die amerikanisch-deutsche Kolonie bei Jaffa als Beispiel christlicher Tätigkeit im Heiligen Land*, Haifa 1993 (in Hebrew). Like Alex Carmel, his teacher, Eisler later cited numerous German publications on this topic.



Figure 106: The oldest kiosk in Neve Tsedek, Lilienblum Street in Tel Aviv (2013)

The Templer settlement of Sarona (now Kaplan street) was founded in 1871. The settlement's residents maintained large plantations, produced wine, and had large vegetable gardens. The settlement's land was bordered on the east by the new urban structure proposed by the Geddes plan, and was not extensively built up as an urban redevelopment project until the land was expropriated in 1948.

In 1902/1903, a new Templer colony known as Hamidije-Wilhelma, which was financed by King Wilhelm of Württemberg, was established between Jaffa and Jerusalem.¹⁶⁵ This settlement (Bene-Atarot) is now located northeast of the Ben Gurion airport runways, and is under the jurisdiction of the Tel Aviv Conservation Team. This area contains what are known in German as Ein-

häuser¹⁶⁶ (standalone single-family dwellings), as well as International Style apartment houses; these objects were designed by F. Katzenwadel, W. Wied, J. Decker and M. Vollmer. The master plasterer and the architect J. Wennagel (among other professionals from Sarona) also built apartment houses in Wilhelma.

Upon the official founding of Tel Aviv in 1908, the only former colonies that were encompassed by Tel Aviv proper were Sarona (and probably Wilhelma as well). Valhalla and The American Colony officially remained part of Jaffa for a longer period, and were thus located in the administratively problematic transitional zone to neighbouring Tel Aviv. Since 1921, the administrative ties between Jaffa and Tel Aviv have become increasingly informal.

The Templers were outlawed in 1945, owing to their German origins. In the 1930s to some extent and in 1948 systematically, the Templers were expelled from Palestine/Israel. This had also happened to native Palestinians in the 1940s. Some of the buildings in the transitional area between Tel Aviv and Jaffa were abruptly abandoned. Later residents and uses of these settlements, combined with taboos (which no longer exist), for many years prevented the history of these originally non-Jewish settlements from coming to light that today are located in downtown Tel Aviv.

The streets of the formerly walled American Colony were laid out in a simple fashion: one main street with a number of side streets branching off from it. Apart from large hotel complexes, a school and a tennis court, the settlement had one unusual feature: prefabricated wood-frame apartment houses built on natural-stone foundations. German Templers added floors to, plastered or made other changes in some of these buildings. The Valhalla colony, however, was more "stone-like" in nature; its name was soon also used for the American-German colony. The important buildings in this colony were the Franz Lorenz house (1895), the Ohler house, the Breisch house and the Wagner complex.

Sarona is located on what is today Kaplan Street, which has been widened. This settlement was designed by a Templer named Theodor Sandel, in collaboration with a

(165) Carmel, Alex: Die Siedlungen der württembergischen Templer in Palästina 1868—1918. — Stuttgart 2000

(166) Goldman (2003) contains numerous photos of buildings from the Benei Atarot Conservation centre photography collection and the Albert Blaich Family Archive in Australia.



Figure 107: A freight train travelling along Yehuda Halevy Street in Tel Aviv. This stretch of track was later decommissioned. It ran through Jaffa, Valhalla and Mansiyeh, which were depopulated. Photo: Zoltan Kluger (1946)

landscape architect named J. Laemmle.¹⁶⁷ The settlement originally exhibited a traditional village structure with medium sized apartment houses with wood fences and lush gardens, in a regular street grid. On older city maps Sarona is shown to the east of the Geddes plan area. In the 1940s, the colony contained numerous public buildings. The Albrecht Aberle house (Wennagel architects' office) from the 1930s and Neef house (1937) are among the last International Style Templar buildings to be built in Tel Aviv. Although their designs are fully in keeping with those of White City buildings, it is clear even from black and white photos that their facades were realized in various light colours. For a number of decades after 1948, these buildings were used by the Israeli army, but nonetheless retained their tranquil and village-like character, until the widening and rehabilitation of Kaplan Street (2003-2008). The area was later renamed Ganei Sarona (Sarona Gardens). Ensclosed as it is between HaYovel Tower and highways,

it has largely lost its historic authenticity, as part of the Kirya area.¹⁶⁸ Relocation of the buildings has also been a major factor in this regard. The area's street layout has also been substantially changed.

9.3 Templar construction techniques and materials

In constructing their early massive limestone buildings, the Templars worked hand in glove with Arabic masons. This resulted in the development of a unique surface structure for stone work.¹⁶⁹

Influential Templar building contractors such as Wieland¹⁷⁰ and Wagner in Valhalla, as well as Beilharz in Haifa (e.g. as a baluster manufacturer) supplied additional materials. Valhalla was dominated by concrete-element, carpentry and metalwork companies. The components for Prussian cupola ceilings were produced by Wieland.

(167) Biography and work in: Lange, Peter: Theodor Sandel, Master Builder for Jerusalem. Portrait of an Almost Forgotten Man. In: In Honour of the Redeemer of the World, Commemorative Compilation. Celebrating the Hundredth Anniversary of the Consecration of the Church of the Redeemer in Jerusalem. Ronecker, Karl-Heinz, ed. – Leipzig 1998, pp. 101–115

(168) See the aerial photos of the current situation, available at <http://en.wikipedia.org/wiki/File:HaKirya.jpg> (18.02.2014) with the numerous historic photos in: Glenk, Helmut; Blaich, Horst; Haering, Manfred: From desert sands to golden oranges. The history of the German Templar settlement of Sarona in Palestine 1871–1947. – Victoria 2005

(169) Goldman, Dan: The Architecture of the Templars in their Colonies in Eretz-Israel, 1868-1948, and their Settlements in the United States, 1860—1925. – Cincinnati, Ohio (Diss.) 2003, p. 345.

(170) On the southwest boundary of the Arabic settlement of Manshiyeh was the campus of the Hugo Wieland factory, which was relocated to this site from Jerusalem in around 1900.



Figure 108: Characteristic street-side garden walls made of precast concrete blocks; Neve Tsedek, Pines Street 30, Tel Aviv (2013)

In 1913, reinforced concrete was used for water tanks and reservoirs, and beginning in the 1920s concrete buildings were built using various construction methods. The cement for these buildings was at first imported from Heidelberg, but from 1925 onward was obtained from Haifa.

Ochre coloured and fairly natural looking precast concrete elements were used for exterior walls and garden walls. These elements were supposed to look like edged and bossed natural stone. Other precast concrete blocks in various forms were also manufactured in Valhalla for load bearing and dividing walls (e.g. the Lippman house in Sarona (1930)).

Hollow concrete blocks were in some cases combined with air-dried clay bricks. For example, for the Kopp building in Wilhelma, overhead concrete lintels were used, as well as high quality waterproof plaster and cooling clay tiles.¹⁷¹ Cement columns, stairs, cornices and glazed floor tiles were manufactured by Hugo Wieland.¹⁷² Clay bricks, however were fabricated and painted by workers on site. Basements were constructed of reinforced in-situ concrete.

From 1920 onward, some steel frame buildings were constructed with non-load bearing limestone facades, and from a structural standpoint are indistinguishable from White City buildings of later vintage that fell within the scope of the Geddes plan. However, most of these buildings were plastered.

Some Valhalla buildings have wood shingles on their facades, as in southwest Germany. Cedar for doors and windows was imported from Lebanon or Turkey. Another common feature of many Templer buildings were their window sills with fixtures in the form of metal elements realized as small figures, used to lock in place window shutters; these were imported from back home.¹⁷³ Lime casein paint was used on interior walls. Artificial ultramarine pigments from Germany were often added to these paints. Pigments (imported from the German firm Wieland) such as ochre were added to exterior plaster – as was done, for example, at the Breisch house and Ohler house (see section 6.1). For other buildings, ceramic tiles were used for roofs and terrazzo for floors. Both were made by the Templer firm Schneller in Jerusalem. Timber was imported from Sweden. Gas-

(171) Goldman 2003, p. 359

(172) All of the technical building information that follows is from Goldman 2003, pp. 234–238, p. 355 and p. 396

(173) Today, for example, the company called Jan Wennesheimer, in Tuttlingen.



Figure 109: Foundation concreting at a Tel Aviv construction site (stereo photograph, around 1930).

line driven cement mixers were manufactured by Wagner, whereas construction materials were supplied by smaller local vendors.

The impact of the Swabian construction market on Neve Tzedek can still be seen today, in that nearly all of the buildings there have red tile roofs. These tiles were imported from France by a Templer named C. Breisch. Other importers also imported construction materials to Palestine, via closely meshed marketing networks for internationally available products.

The Valhalla company called Hugo Wieland made cement roof slabs. As a result, prefabricated concrete elements from Wieland predominated in Valhalla buildings. In Neve Tzedek, Chelouche Brothers competed with Wieland by offering similar products. The residential buildings in this area exhibit a mixture of Arabic and European construction methods, in terms of their ground plans, roof contours, and construction methods.

The Wennagel brothers,¹⁷⁴ Theodor Sandel and Martin Steller were the main Templer architects in Tel Aviv for Christian owners, Jewish owners, and the Ottoman government. Both Hugo Wennagel and Martin Steller did their training at the architecture

school in Lemgo, achieving success in their new hometown of Tel Aviv as Bauhaus architects¹⁷⁵ (e.g. the Eugene and Elly Seller house, the new Venus house and its tennis court; the Otto Jung house; and the Aberle house).¹⁷⁶

The extant Templer buildings and settlement structures in Tel Aviv are the heritage of a shared past, and bear testimony to a direct antecedent history of German and Israeli relations. This exciting topic area has particular historic value, which from our standpoint could be put to good use in the envisaged visitor and heritage conservation centre as part of the Israeli-German network.

In 2006, Eretz Israel Museum in Tel Aviv mounted an exhibition about the history of the Templers in Palestine titled "Chronicle of a Utopia – The Templers in the Holy Land."

The envisaged visitor and heritage conservation centre in Tel Aviv could also help to use the Templer settlements and buildings as a source of knowledge about construction history.¹⁷⁷

(174) Johann Martin Wennagel (1851—1881), Josef Wennagel (1878-1949), Hugo Wennagel (1907)

(175) Goldman 2003, p. 249.

(176) *Ibid.*, p. 257.

(177) The archive of the successor organization of the Temple Society is the Freie Christliche Gemeinschaft in Stuttgart-Degerloch. This archive contains biographical materials and numerous documents about Palestine. Along with the Landeskirchliches Archiv Stuttgart and the Institut für Landesgeschichte at Universität Stuttgart, the archive serves as a resource for networks, biographers, and architects.

10 Archives

10.1 Archives used

Akten Dammerstock: Karlsruhe Danziger Straße 12–14 im Regierungspräsidium
Karlsruhe, Referat Denkmalpflege

Expert report by the Tel Aviv Conservation Team
(available as PDF files, in Hebrew only)

- Aharonvovitch Street 2
- Mazeh Str. 31
- Idelson Street 14
- Rothschild Boulevard 117 (excerpts)
- Idelson Street 29
(only the ground plan for the ground floor conversion)

effectBIZ team Management & Business consultancy (eds.): Feasibility study for the
establishment of the "White City" centre in Tel Aviv-Yafo, For: The conservation dept.
Tel Aviv-Yafo Municipality, June 2013 (unpublished manuscript)

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<http://lib.stanford.edu/eliasaf-robinson-tel-aviv-collection>

Documents of the inhabitants' protest to the redevelopment of the area as a
shopping centre, ca. 1971—1977. (<http://searchworks.stanford.edu/view/7149636>
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World Heritage Scanned Nomination. UNESCO Region: Europe and North America.
File name: 1096.pdf. Site name: White City of Tel-Aviv – the Modern Movement.
Date of Inscription: 5 July 2003. State Party: Israel.

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"Erhaltung, Abriss, Aufstockung: Die Zukunft des Bauhaus-Erbes in Tel Aviv."
Last updated October 2013

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10.3 Graphics

1.3 Bibliographical information about the photos

Caption

Photo credits etc.

- Figure 1: Advertising poster of unknown origin titled "Tel Aviv. The First 100% Hebrew Town in the World" (1939—1947)
Black and white photo, 168x 236 mm, Stanford University Eliasaf Robinson Collection
Reference Id 00016078_21791
By courtesy of Department of Special Collections and University Archives, Stanford University Libraries
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- Figure 3: European immigrants arriving at the port of Jaffa (photo by Rudolf Jonas, date unknown)
Archive of the photographer Rudolf Jonas (1898—1972) (see Kedem Auction no.26). No copyright restrictions.
By courtesy of Meron Eren, Kedem Auctions, Jerusalem
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Plan of Jaffa, by: Survey of Egypt, 1918. (Folding lithograph plan, printed in colours. Dimensions: 540 × 515 mm) Stanford University, The Eliasaf Robinson Tel Aviv collection, ca. 1909—1960 Reference Id 00016905
By courtesy of Department of Special Collections and University Archives, Stanford University Libraries
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Base map: © OpenStreetMap contributors Tel Aviv White City WHSCC BY-SA 3.0 (21.10.2014)

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C. Blatt, Deutscher Wetterdienst (2014). Wetterlexikon – Beaufort-Skala. <http://www.deutscher-Wetterdienst.de/lexikon/index.htm?ID=B&DAT=Beaufort-Skala> (26.05.2014)
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Christian Blatt, modified based on Leusden, F. P.; Freymark, H.: Darstellungen der Raumbehaglichkeit für den einfachen praktischen Gebrauch, Gesundheitsingenieur 72 (1951) Heft 16, pp. 271–273.
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From "20 Postcards of the new working Palestine by Yaakov Benor-Kalter"
published by S. Adler, Haifa (1934 or later). Text on the reverse side: Houses in Hayarkon Street, Tel Aviv, Photo: Benor-Kalter.
From the collections of: Jüdisches Museum Wien, Inv.-Nr. 12.379 and Stanford University The Eliasaf Robinson Tel Aviv collection, Reference Id 00016164_21978
U.a. abgedruckt in Purin, Bernhard: Die Welt der jüdischen Postkarten, Ausstellungskatalog Wien 2001, p. 115.

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*By courtesy of Nitza Smuk. In: Nitza Metzger-Szmuk: Des maisons sur le sable
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C. Blatt. Weather data source: Harald Drück, ITW, Universität Stuttgart.
- Figure 90: Erosion rate for corrosion, relative to temperature and relative humidity in a moderate and hot climate
Ulf Nürnberger, In: Korrosion und Korrosionsschutz im Bauwesen Band 1, p. 208 Figure 2.11

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National Photo Collection, Item No. 0004.152, Code D839-114, date 31/12/1946, Photographer: Zoltan Kluger
By courtesy of Government Press Office (GPO), Israel
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