

Construction of diplomatic embassies, post-independence New Delhi

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ABSTRACT: The newly independent Republic of India was for many countries an especially important location to develop an international presence and contribute tangible manifestations of their design ideologies. Extraordinary buildings were designed, and construction techniques evolved for their completion, by several modernists such as Edward Durrell Stone, Hans Hofmann and Johannes Krahn. The construction processes and their difficulties are rarely highlighted, and the importance of these rarely recognized, either in India or internationally, apart from some identified by their respective countries as significant buildings. Our intent is to critically evaluate the significance of this important parcel of architecture by examining and analyzing the construction processes, understanding the influence and exchange of materials and technology, and to acknowledge the role of local consultants and contractors in the construction of these buildings. Lastly, to review their significance and contribution to future developments in India.

1 INTRODUCTION

India, post-independence, was looking for a style that would resonate with its newly found freedom from the British Empire and be a symbol for the whole nation. Under the first Prime Minister, Jawaharlal Nehru, the vision of Modern India was bolstered. Emphasis was laid on science and technology, and methods to support industries while catering for the newly migrated population. In line with his ideologies, Nehru encouraged modern designs under the Central Public Works Department, Government of India (CPWD). Le Corbusier was invited to plan and execute the city of Chandigarh, where Nehru desired to hold diplomatic exchanges of new India with the world.

1.1 *Planning of Chanakyapuri*

In 1950, an area of 900 acres lying behind the commander in chief's house (Rashtrapati Bhawan) was reserved for the Diplomatic Colony, with 450 acres for actual building construction. The land was divided into four-acre plots with the maximum allotment for embassies being 20 acres. Regulations and byelaws had to be followed as per the New Delhi Municipal Corporation building guidelines (Ministry of WHS, Protocol Branch, 1953). Amenities like site clearance levelling, electricity, water, roads, sewage, drainage and horticulture were to be provided while the actual building work was left for the foreign missions to undertake. Given the material shortages and strain on industries during this period, material provision was considered high priority to allow completion within a reasonable time.

1.2 *The Corbusier influence*

Chandigarh and Corbusier's work in concrete, pre-cast panels, glass and metal had created a benchmark of modern design in India, especially for the foreign missions. Many either visited Chandigarh, given its proximity to Delhi or had been much aware of it, and been influenced by its architecture. Chandigarh's construction happened in parallel with the construction of many embassies.

1.3 *Search for Indian-ness*

The embassies' paramount function was to represent their national identity in India, but also to accommodate the culture and region of the foreign land. While some adopted traditional features pertaining to the micro-climate, others took inspiration in modernizing the heritage. Courtyards, screens, use of water features and local materials being the primary considerations.

2 EMBASSY DESIGN AND CONSTRUCTION

This paper investigates the pioneering embassies in New Delhi, for they laid the ground for others and perhaps faced the most difficulty and need for alternative methods of construction.

2.1 *The American Embassy, 1959*

Designed by Edward Durrell Stone, representing modernist philosophy, the American Embassy buildings were the first to be constructed in Chanakyapuri,

Delhi. The chancery is a two storey, large rectangular (appx. 122 m × 58 m) building perched on a podium with an equally large roof overhang. The rectangular building has a central water garden flanked by corridors for offices. The construction primarily comprises a Reinforced Cement Concrete (RCC) framed structure since India was already well versed with the material. Both brick and hollow concrete blocks were used to install walls.

The RCC and brick structure is covered with a variety of finishing materials. The base or podium is faced with slabs of Indian marble while the floor is marble border, terrazzo and sandstone. Italian marble had been under consideration, but the likelihood of a long delivery time made Stone decide on Makrana marble, an Indian variant (Weiss Manfredi Architects 2016, 62).

Large screens of terrazzo spanning from floor to roof were installed along all four façades. The screens made on site are prefabricated modular units (Weiss Manfredi Architects 2016, 117). Constructing the screens on site was a landmark, as all work would have been handcrafted given the lack of machinery. The embassy can be credited for transforming the traditional *jaali* into a modern form, widely adopted in establishing the modern architecture of the capital. The perforated screens were also used by Stone in his New York house and the chancery as an influence for the Kennedy Center.

In situ terrazzo wraps finished all surfaces of the building. This building may contain one of the largest applications of terrazzo of this scale and is not seen anywhere else in Delhi. Full length glass windows held in aluminum frames are installed at large openings behind the screen. The large overhang is supported on slender steel columns, originally with gold foil finish.

Chancery offices have practical and functional materials compared with those employed in public spaces. On both floors, the walls in the offices are plastered and painted with flush doors with outer louvre doors. The outer walls are fixed glass panels set in wood frames. Air conditioning units run along the floor but are enclosed in louvered wooden cabinetry. The east elevations of the water garden on both floors consist of decorative metal screens that allow light from the two-storey entryway (Weiss Manfredi Architects 2016, 54).

One can see the advances in technology and technique in this case. Air conditioning systems were uncommon, and their working and ducting was not used in other buildings, apart from a few palaces. The technique of using concrete ribs to accommodate air voids as insulation is certainly a wise technique to accommodate the climate. Perhaps inspiration for the embassy derived from the Taj, a Mughal magnificence clad entirely in white marble (Figure 1).

2.2 The Embassy of the Federal Republic of Germany, 1956–62

Located on main Shantipath, the German Embassy in New Delhi was the first new diplomatic mission

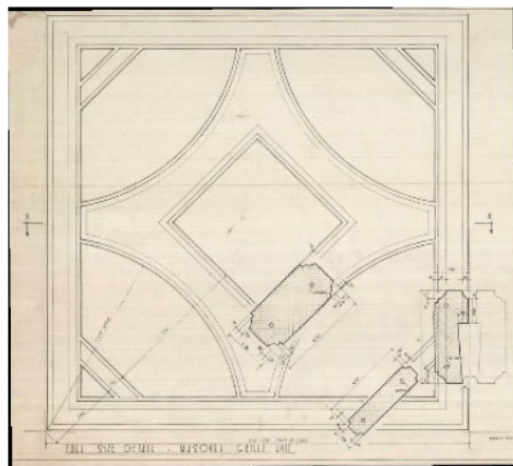


Figure 1. Initial Screen Module detail with reinforcement (Weiss Manfredi Architects 2016).

building to be built by the young Federal Republic following the end of the Second World War and thus assumed special importance, symbolically underlining the country's reintegration into the Western community of values (Matussek et al. 2010, 17). The embassy complex was built based on plans prepared by Johannes Krahn and executed by their local architect Karl Malte von Heinz. The building represents simplicity and functional values adapted to local climatic conditions. The chancery along with a small residence is a long, compact rectangle (65 m × 16 m) with ground and four floors, facing Shantipath. The ground floor is partially open to accommodate a shaded car park. All upper floors are used for office spaces on both sides of a central corridor. When inaugurated, the construction of this building was an example of German innovation and craftsmanship.

The chancellery block is constructed by employing a RCC frame. While the exterior walls are installed using bricks, the interior partition walls use concrete blocks. The roof is unique compared with other embassies built earlier. It comprises two slabs (double) or butterfly roof, one flat slab connected to the beams and columns of the lower floors, topped with another inclined as a protective barrier to reduce the impact of heat on the main roof. The dramatic flying roof that seems to be full of energy and movement recalls the image of Le Corbusier's pilgrimage church in Ronchamp (Matussek et al. 2010, 31).

The climatic response is realized in the configuration of windows too, which are recessed from the main façade. In addition, the façade has been covered with louvres acting as sun shading devices for the two main façades (west and east). The louvres are made of steel sheet and steel pipe welded together and chemically polished and anodized in natural color. Louvres very clearly indicate inspiration from the Government Press building in Chandigarh which has a façade covered with concrete louvres and was built in 1953. The

German architects were clearly inspired by their visit to Chandigarh (Matussek et al. 2010, 32).

The north and south façades are clad with Makrana marble slabs, as is the ambassador's residence and other official apartments. The choice of materials was not only determined for aesthetic reasons but also for the fact that excessive monsoon rains and sandstorms have a lesser effect on marble than they do on other cladding materials (Matussek et al. 2010, 31).

Metal doors, windows and the use of glass are a reminder of Germany's progressive industrial potential. As in the chancery building, the aluminum rolling shutters confirm high mechanical achievement. The mechanical investment would have been a gamble as electricity supply was often hindered in the city and generators for such large-scale purposes sparsely produced.

Unlike the chancery, the ambassador's residence was built of brick (Matussek et al. 2010, 32). The appearance of the ambassador's residence is largely determined by comparatively small windows and balconies. The balcony parapet is geometrically cut to profile steel sheets. The residence's porch was probably the most imaginative and bold structure to be built in New Delhi (*The Indian Architect* 1959, 13). This expressive gesture contrasts with the otherwise calm and modest appearance of the complex. False ceilings with geometric patterns are installed in many rooms and carry the ducting above them. The use of glass blocks is noticeable in both the chancery and ambassador's house. Small circular glass blocks set in concrete walls have been used in the residence block next to the chancery. Skylights were another new feature of the building, particularly the acrylic dome as seen on the residence's overhang. Skylight profiles, roofs and structural members were rarely seen, coming from a strong colonial hold. However, in the subsequent decade, many experiments were made giving a modern feel to the city's architectural look.

The numerous drawings showing elevations, sections and details are proof that a good number of design decisions were taken while under construction (Matussek et al. 2010, 29) (Figure 2).

2.3 Swedish Embassy, 1959

The embassy was Sweden's first large-scale modern expression built by Jöran Curman and Sune Lindström, with assistance from the local architect masters, Sathe and Kothari. The Swedish Embassy is perhaps the simplest in the entire Chanakyapuri. In response to the climate, the architects selected simple construction techniques and functions for the basic design. This very humble piece of architecture is regarded an example of internationalism and migrational architecture (Hagströmer 2012, 171).

Planned around three sides of a courtyard, the single storey structure was a way to avoid complicated construction in India, which the Swedish felt was not too developed (*The Indian Architect* 1960, 14; *Arkitektur* 1961, 154). All the buildings are south facing

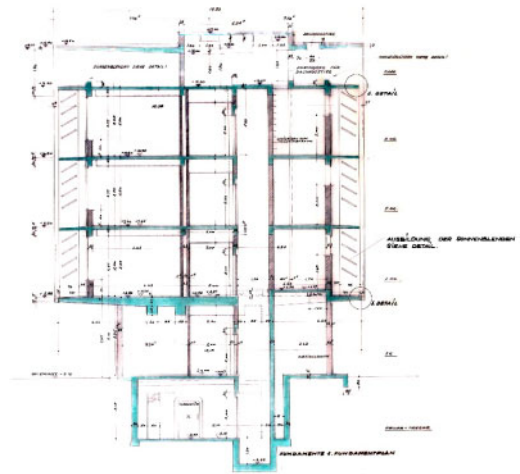


Figure 2. Section through the chancery. Note the double roof and deep-set windows with louvers (Matussek et al. 2010).

with short east and west sides and protected by vegetation. Both south sides of the building are shaded by colonnaded corridors. The structure is constructed with RCC foundations and the framework with brick masonry infills. The brick columns supporting the corridors are also a part of the structural system. The exterior walls and roofs are heat-insulated, and windows airtight (*Arkitektur* 1961, 156). Concrete, asbestos sheets and prestressed beams form the roofing system. A flat roof or rain roof has been used to span the interior spaces which is topped with a separate ventilated sunroof. Brick has been used as cladding material for all façades and painted red/pink, adding to the simplicity and earthy character of the building. White painted bricks have been used in parapets in profiled patterns forming a unique feature of the building, moving away from ornamentation or elaborate façades. The brick patterns help break the scale and length of the building.

Doors, windows and built-in cabinets are made of Indian teak. The floors are terrazzo, Indian kota stone and, in some places, marble. Concrete screens have been strategically and carefully placed across openings for indirect sunlight. The interiors are filled with imported furniture, products, and fittings, harmoniously complementing the Indian material palette (*Statens Fastighetsverk* 2020).

2.4 Embassy of Switzerland, 1963

Designed by Hans Hofmann and implemented by Walter Rüegg, the building with the chancery and residence under a single roof was one of the most important architectural symbols of Swiss diplomacy to that time (Maurer 2018, 29). The embassy building is rectangular (80 m × 40 m), double storey, with two inner courtyards. The structural system has columns and concrete cross walls enveloped by an arcade, all

in exposed concrete apart from the façades which are clad with precast concrete slabs. Modular brick was used for the foundations and other masonry work.

A slender but prominent flat roof projects out from the main building cantilevered beyond the façade by six meters, protecting the building from direct sunlight and the monsoon rains. The roof uses an imported prestressing technique, a Birkenmeier, Brandestini, Roß Vorspann system (BBRV) developed by Stahlton (Maurer 2018, 111). The Swiss Embassy was the first building in New Delhi to install a prestressing technique.

Apart from concrete, a large number of surfaces are clad with black marble. It was recorded that the slightly slaty and extremely hard black marble caused difficulties in workmanship. Special care, and consequently time, was needed to link the marble connections with the aluminum windows on the upper-storey terrace (Maurer 2018, 112). For the floor surfaces, various types of terrazzo, grey-green polished limestone slabs and marble have been laid, depending upon the purpose. The light green, slightly shaded ornamental modelled coats on the plastered walls, the white ceilings and the warm brown of the cabinet fronts and doors made of local processed teak give the rooms a light atmosphere (Maurer 2018, 113). The cantilevered roof slab makes a statement of its own and many future embassies adopted this feature.

3 FRONT END: LOCAL ARCHITECTS AND CONTRACTORS

In the 1920s, Delhi had one contractor who could build in RCC, but by the end of 1960s, just three decades later, the city directories listed people who were prestressing experts (Tappin 2003, 1933; Delhi Progressive Enterprises 1964, 204). The embassies provided a hands-on experience for the contractors who could learn and advise on imported techniques within the Indian context. Some are discussed below.

3.1 Sardar Mohan Singh

Sardar Mohan Singh was awarded the contract for the American Embassy in partnership with Tirath Ram Ahuja. However, the partnership dissolved soon after the completion of the main buildings (Deolalikar 2020). The duo was also responsible for the first modern hotel in Delhi, Ashoka, built during the same period, which led to an exchange of techniques and experts between the two projects. Sardar Mohan Singh, known as the furnishings king, started Oriental Building and Furnishings Pvt Ltd from a small workshop. During the Second World War, when American troops established a base in Delhi, Mohan Singh became familiar with many, ultimately being assigned numerous contracts by the Americans and British alike. This acquaintance took him on a tour of America in the year of independence and following this exposure, he came

back with new ideas and visions (Arunam & Sheel 1950, 37).

Building materials, furniture and furnishings were also under the same contract for the embassy. Furniture was designed by Edward Wormley of Dunbar Furniture Company of Berne, Indiana, which Mohan Singh finished to a superior quality (Weiss Manfredi Architects 2016, 30). This was the first contract of its kind, entrusting all works to a single contractor (Hindustan Times Weekly 1959, 8).

Given his experience with both Americans and British, Mohan Singh was familiar with quality design and could offer suggestions to balance the architect's proposition with construction efficiency. For the embassy, he suggested switching from teak to aluminum window sashes for the chancery and staff housing, with slight alterations to the design of Stone's terrazzo grille blocks for the screens that simplified fabrication and repetition (Weiss Manfredi Architects 2016, 30).

Along with Mohan Singh, three American architects and three engineers were also on site as a support team given Stone's absence and sparse visits (Maurer 2018, 104). Adolf KN Waterval was the American project supervisor (*The Sunday Statesmen* 1959, 3). Also involved on a regular basis as a consultant was local architect KP Sharma, and engineer BS Puri who was the engineer for the hotel project as well (Weiss Manfredi Architects 2016, 30). S.G. Deolalikar who undertook the plumbing works was his companion for many future projects (Deolalikar 2020).

The completion of the American Embassy, as one of the most significant architectural contributions to the Diplomatic Enclave and Delhi, having a richer material palette than what the rest of Delhi could afford, can partly be credited to Mohan Singh bringing in a team of skilled technicians and workers. His experience with his first led him to successfully complete construction for many others, like the Pakistan and Australian High Commissions (*The Indian Architect* 1959, 4).

3.2 Tirath Ram Ahuja

Established in 1950, Tirath Ram Ahuja Pvt. Ltd, was engaged on numerous large-scale projects, including several banks together with architect masters, Sathe, Bhutta and Kothari (Maurer 2018, 108). Tirath Ram was commissioned for many embassies, including Polish and Singapore, the first being the Swiss Embassy. At the same time, Tirath Ram was involved in the construction of the India International Center designed by American architect Joseph Allen Stein, later commissioned for the Australian High Commission.

By the end of 1960, Tirath Ram was one of six shortlisted for the construction of the Swiss Embassy. This project was challenging especially as the building stands in exposed concrete with a large overhanging prestressed concrete roof. Kanvinde & Rai, architects and engineers, were brought on board as site supervisors and collaborators especially for planning and execution of the staff quarters. However, given the

challenges and need for technical assistance to maneuver concrete for a good finish, engineer and architect Walter Brandli and Walter Ruegg were asked to be present in New Delhi to supervise along with an Indian site manager, DR (Maurer 2018, 111-36).

In addition, there was the challenge of fluctuating electricity and inconsistent labor. Site labor would change every day, throwing the contractors the challenge of briefing a new set of people each day, sometimes up to 200 workers some of whom were still children. This would not have been possible without the mediation of the Indian companies responsible (Maurer 2018, 111).

Concerning exposed concrete in Delhi's high temperature and hot air, the contractor had several times to take the decision to rough dress parts of pillars and recast them. In a particular instance, Tirath Ram's material spares from another project yielded good for the Swiss Embassy. To save wood given its cost and shortage, the tie beams were to be supported on lattice girders and, fortunately, Tirath Ram had about a thousand lattice girders. However, even Tirath Ram did not know how the girders were supposed to be used and the supervisor had to make sketches themselves, leading to a quicker and more fruitful process. (Maurer 2018, 140).

3.3 *Masters Sathe and Kothari*

Master Architects Sathe and Kothari were ordained local contractors for many embassies, including the Swedish, USSR and Norwegian. They contributed 30% of India's growth post-independence (Master and Associate, n.d.). Apart from the embassies, they were engaged in various large-scale projects, including the Swedish mission's Bonow House in Delhi designed by the Swedish architect Gunnar Savas in collaboration with the Swedish engineering firm SENTAB. This collaboration perhaps started at the Swedish Embassy and continued to the Norwegian as well (International Co-operative Alliance – Asia & Pacific 2010, 72).

3.4 *Specialists – Swedish & German Embassy*

Unlike the Americans, the Swedish had multiple sub-contractors with SENTAB as the general contractor. A different contractor for painting, flooring and plumbing was chosen. John Tinson & Company Pvt. Ltd undertook their sanitary works. They worked for the Norwegian, Japanese and UK High Commissions' residential blocks and servants' quarters also (*The Indian Architect* Advert, 1959). Painting work fell under John Flemings and Company who were agents for Noble paints and took on the embassies of USSR and Norway. Both Sweden and Norway preferred plain painted façades. Flemings later worked on important institutional buildings in Delhi, while Modern Tiles and Marble were responsible for terrazzo works (*The Indian Architect* Advert 1959, 2–6). The flooring for the German Embassy was assigned to terrazzo specialist, R. Lorenzoni and Company.

3.5 *Air conditioning: Voltas*

Air conditioning was an aspect which did not expand locally: only a few hotels like Ashoka and the Rashtrapathi Bhawan. Voltas, a partnership between TATA group and Volkart Brothers of Switzerland, took on the responsibility of installing Carrier air conditioning units (Maurer 2018, 42). Carrier, being American was brought to India by Voltas. Most diplomats felt the need to have air conditioners since the climate in Delhi was unknown, especially the harsh summers. Apart from the American Embassy, whose air conditioning was also under Mohan Singh's scope, Voltas completed installations for all the other embassies till 1968, perhaps being the only choice without importing machinery. The method of ducting, fabricating vents and grills, and housing them in a false ceiling were not familiar aspects of domestic architecture.

3.6 *Other noteworthy contractors*

There is conflict of information in published journals over general construction contracts for the German, Swedish and Russian Embassies. Both Harbans Singh and United Builders take credit. It must be noted that the construction of the German Embassy took six years (Matussek et al. 2010, 40). This could possibly explain the claims by the different contractors. In addition, SENTAB being a foreign engineering company perhaps would not have been able to execute orders themselves and would have hired a local subordinate.

4 TRENDS IN BUILDING MATERIALS AND CONSTRUCTION TECHNIQUE

Production of cement and steel started in India in 1915 while glass too was produced at Dehradun and Firozabad from 1916 (Indian Industrial Commission 1918, 299). Despite in-house set ups, towards 1947, there was a serious shortage of materials. Basic construction material was rationed and that available was at much higher cost. "Bricks are not available at even fifty per cent more than the normal prices" (Mehra 2013, 361). This shortage had carried well into the late 1950s when the government advised on efficient use of materials and launched initiatives to limit the use of cement suggesting it be switched with lime. Embassies, too, faced shortages and had to make informed choices as different materials were available at similar prices. In addition, materials had to be locked and secured to prevent theft. The Government of India, however, believed the home industries were sufficient to provide materials to the embassies, and any additional items required could be imported with all customs duties being paid, apart from fixtures and furnishings (Ministry of EA 1953). Steel either came from the TATA steel plants, TISCO and government undertaking SAIL, or Indian Iron and Steel Corporation, IISCO (Railways Works Branch 1957). Aluminum was also available locally, however mostly through an American

company, ALCOA (Deolalikar 2020). Jindals started producing many aluminum sections by the end of the 60s, given their popularity in town, a material that almost all embassies chose during the 50s. Chandigarh too, perhaps, would have been an aid to the embassies apart from its architecture, as it attracted many industries to set up on the outskirts of Punjab.

Many diplomats feared the availability of electricity, generators and equipment in India which could hamper construction. Some were noted visiting each other's sites during construction to discuss the problems faced. But the availability of skilled labor made up for the lack of equipment, many parts being either handmade or hand finished (Maurer 2018, 101).

The material choice for the American Embassy, with fine terrazzo, Makrana marble, brass hardware, and gold filmed columns, made it expensive and exclusive. The steel columns provided by J.S. Fries Sohn, of Frankfurt, Germany, were gold filmed in Delhi. Material shortages impacted prices mostly. Instead of bronze grilles, the contractor offered gold finished cast aluminum, which Stone approved. For the steel columns intended to support the trellis at the staff quarters, a Bombay fabricator was selected, who suggested replacing wood with steel at no extra cost as there was a shortage of wood (Weiss Manfredi Architects 2016, 61-8). Anodizing technique was introduced by Mohan Singh and used for the embassy as well. A pre-plumb system was imported for plumbing, especially of the ambassador's residence which also used copper pipes in place of cast iron pipes, swaying away from the generic economic norms (Deolalikar 2020).

In terms of technical assistance, an Italian shell structure expert, Dr A. Carbone, was hired when the pool slab failed, and he suggested methods to cast another one with the help of pile foundations (Weiss Manfredi Architects 2016, 66). In a similar situation, on one of the visits of the Swiss architect in-charge, Walter Reugg, the freshly cast roof slab had sagged, which made Reugg call for prestressing experts and help from Switzerland (Maurer 2018, 111). Mirko Robin Ros from Stahlton Company was approached who sent Mr Ivano Dompieri on 21 June 1960 to introduce the BBRV system developed by them, making the Swiss Embassy the first in Delhi to use a prestressing technique (Maurer 2018, 111). The exchange could possibly have triggered a series of advancements beginning with prestressing cables being manufactured locally from 1961 (Indian Standards Institute 1961, 2). The Swiss had opted for simple materials and exposed concrete which turned into a challenge and approximately twice as expensive as in Switzerland. One of the field notes explained: "the air is extremely dry and the surface of the concrete turns white almost instantaneously if wet Jute sacks are not immediately laid over it and kept constantly damp. The problem of curing the concrete, and shrinkage in particular, is making things extremely difficult for us" (Maurer 2018, 111).

The German focus on precision and opting for mechanical fixture was evident, re-enforcing their



Figure 3. Indian team for the American Embassy, Sardar Mohan Singh seated in the center (Deolalikar 2020).

identity through skilled and polished technical skills. The Swedish wanting a simple look called for "brick-layers from Rajasthan who camped on site with their families" (Hagströmer 1959, 171). The overall rhythm of the brick, profiled roof, and fixed concrete louvers represented a new method of achieving something simple and aesthetically pleasing. Electric and Mechanical installations were imported from Sweden as was all the furniture (*Statens fastighetsverk*). The color choice of the exposed brick further distinguishes it from the local bricks.

5 CONCLUSIONS

Construction of embassies in New Delhi contributed to shaping the future of construction in the city. It created new opportunities for architects, engineers, contractors and construction workers. Local and international collaborations enhanced knowledge about design and building techniques and materials which were implemented in the building of modern Delhi. Together the cluster of the Diplomatic Enclave exhibits the unique identity and approach of each building. Not only the know-how of methods, but the design choices of various nations, including fixtures and furniture, came in the form of a permanent exhibition in the city. The mention of contractors and technicians in the narrative of building construction in India is extremely rare. Furthermore, the lack of documentation about the parcel and contribution of the people associated with its development further reduces their significance in the city's growth. Only a few countries have registered their buildings as significant (Figure 3).

Acknowledging its value, the US Department of State placed the chancery on the Secretary of State's Register of Culturally Significant Property in 2004 along with 26 American diplomatic properties. The Swiss, in 2004/5, submitted an initial comprehensive redevelopment by the Federal Office for Building and Logistics (FLB) based on the assumption that the embassy building should be integrally preserved as an

outstanding witness to modernism and not be hampered when new blocks were added, but no formal protection exists (Maurer 2018, 115).

Sadly, Indian laws do not protect heritage under 100 years old as the preservation of modern heritage is a recent phenomenon in India. These properties are also considered foreign land and therefore none of the embassies have been identified as historic landmarks under any Indian law. However, recognition of the Capitol Complex Chandigarh as a UNESCO World Heritage site represents a growing awareness towards the preservation of modern heritage giving hope for the Diplomatic Enclave.

6 NOTE

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