

Metamorphosis of Rotterdam Central Station in Renovation Process Synergy of Urban Node and Transportation Passages

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Abstract | Border between intercity transportation passages and urban fabric known as the most challenging topics in urban landscape. Railway infrastructure widely effective in urban landscape interruption that needs multidisciplinary urban professions to be amended. Transportation passages, the vital and functional framework as well as the urban generative, interact with the city while playing a key role in urban landscape. Urban nodes in the confluence of urban spaces and transport infrastructures, meet the qualitative basis of urban and social development. The proper approach toward this field that enhances the urban landscape has been evaluated on the basis of surveying an urban node attributed to urban landscape policies.

Rotterdam Central Station renovation in metamorphic process of an urban node into a public plaza, considering infrastructural-based attitudes and revising the urban landscape in socio-historic context, entailed metamorphosis in urban space as development incentive and attraction point of reviving processes. Passages and urban flows separated due to penetration of railway network into the urban fabric, will be reconnected through this central hub to integrate facilities and flows.

The design offers solutions to amend the rupture of urban fabric by railway tracks, such as improving quality and satisfactory of the urban space through decreasing borders, physical and social barriers, and enhancing mental maps via increasing transparency, legibility of urban space engraving on memory. Also increasing the presence of people, perception of place and social interaction throughout juxtaposition of dynamic urban flows, result in enhancing the experience of local qualities associated with the synergy of urban node and urban landscape.

The significant location of station in Europe transportation network and homogenous development of urban fabric, leads to a comparison with metropolitans of Iran with respect to Long-term Development Plans and socio-political position. The question is “How hidden capabilities of urban courses can alter the urban predicament into the opportunities of urban development?” The approach of survey is applied research and assessing method, case study method used in collecting information and qualitative method in analyzing data.

Keywords | Railway Infrastructure, Transportation Passage, Urban Fabric, Urban Node, Urban Landscape.

Introduction | The basis of dynamism in urban life constitutes of movement, activities and urban events roots in this movement. This has varied appearances in urban life, so transport infrastructures as the most dominant and tangible feature interact with urban landscape. Development and metamorphosis as mode of urban landscape, affect generation and function of transport passages in city. Thus urban passages and flows generate cities by associating and rupturing urban fabric.

Prevalent methods of transportation and relevant policies are mainly what engender flowing passages in the city. In pursuit of urban policies during the last century it is admitted that urban growth, automotive transportation methods and related infrastructures outspread, gradually lead to approach shift toward sustainable methods of movement, as the personal vehicle dominant role appeared by the beginning of 20th century followed by elimination of pedestrian, however, after a century, sustainable methods of transportation such as public transport, cycling and walking prevailed. Thus urban policies are affected by the urbanization culture of residents as well as affecting the experience of the urban landscape.

Transport passages, sidewalks, parks, recreational spaces, plazas and other outdoor spaces in city are considered as components of public realm, or open space in background history in contrast with private ownership. Due to urban sprawl that increases the semi-public spaces managed by private sector, it challenges public space concept that need to be recognized separated from individuals or institutions enclosure, accessible to public (Blackmar, 2006). Furthermore, the notion of public realm is reiterated in urban planning field as a vital component of city because of political, social, economic, public health and biodiversity reasons, but prevailing trends are reducing the public realm instead of growing it. Various types of privatizing

processes generate urban conpication less open to habitants such as suburb towns, highways, chain stores, theme parks, close-knit communities and surveillance technologies, promoting enclosure in urban environment. Global indicatives upon race, gender and level illustrate increasing social gap among societies (UN-Habitat 2004).

Public space has become an essential tool for policy makers and planners in order to mitigating urban dilemmas and considering sustainable development, spatial justice, and civil rights. European cities in the last three decades experienced immense changes in investment and development of sustainable transport due to multifaceted energy and transport policies of EU that led to High Speed Railway (HSR) network. These cities have been challenged by joining the HSR by reason of the need to preparation of infrastructure as intrinsic complexities and scale of interference as urban-regional. HSR projects include railways, stations and adjacent urban spaces by virtue of being situated on existing railway network and old urban fabric, therefore simultaneously affect urban landscape, architecture, traffic and related fields. This setting responds to essential need of transportation and also in regard to altering from the railway as barrier to the railway as link in the city.

Rotterdam, Inception of Revision to the Correlation of City and Transport

The first Rotterdam Central Station built in place of the remains of old station demolished in World War II by Sybold van Ravesteyn and inaugurated in 1957. The station located at the verge of old fabric toward the city center and back on to the residential neighborhood, responding the necessities of that day in a closed, inflexible and non-interactive space within the city and flowing urban life.



Pic1: Expansion of Rotterdam Central Station to the Downtown commercial axis.

Source: <http://historiek.net/sybold-van-ravesteyn-1983-1889-een-uitzonderlijke-spoorwegarchitect/61312/>

Urban development and accumulation of gradual built environment as transport infrastructure that emerged from quantity-based preferences, entail spatial split in the city that lacks flexibility of a dynamic urban space. In accordance to reconnecting the urban spaces, social classes and economic subjects, team of designers and planners gave preferences

to design guidelines that create public space continuity and improving spatial experience. Old station demolished in 2007 while serving the passengers, until the new station renovated and inaugurated in 2014 including HSR, Light railway, Metro, Taxi and bus stations that growing number of travelers to 300,000 is expected in the near future.



Pic2: Meeting of passages and urban fabric.
Source: <http://bogue.nl/wp-content/uploads/05/2015/FU1A7400lowres2200-x1467.jpg>.

Rotterdam Central Station in the region

Rotterdam Central Station is one of the four main stations of the Netherlands that connected to the whole cities and is the first station by entering from the southern European countries. This station is part of European transport network and also as significant urban node in Rotterdam downtown. This dual function of the station and its vicinity in local and territorial

scale, makes it inapplicable to the old station. New station as coherent entity should cover the whole necessities of the complex, therefore a 250- meter long roof integrates passages, platforms, halls and underpasses as associating separated 19th century residential neighborhood with commercial and recreational spaces of southern downtown.



Pic3: Old building of Rotterdam Central Station 2007-1975.
Source: <https://www.flickr.com/photos/manhattanrdam/14834376552/>.

In the north, the entrance harmonized with serene, green and old residential fabric by simple and transparent volume, by contrast in the south toward the city center, high ceiling hall with huge special shaped canopy made of wood and steel, formed the main entrance as pointing to the city center urban space and towers. Design team comprised of Bentham Crouwel Architects and MVSA Architects as architects and West-8 group as landscape

architects. Design approach conceived of the point of view that considering the station as urban plaza instead of closed space restricted in a building. This approach has a great impact on simplifying the complexities and problems of the station (Berkers, 2015). Project demands, design concepts among architects, landscape architects and planners are concluded as mentioned below:



Pic4: Northern entrance toward residential fabric.
Source: <http://teamv.nl/project/rotterdam-centraal-station/>.

Multiple complexities

Rotterdam Central Station complex encompasses multifaceted complexities in physical and mental organizations. This complex as transit node contains different transportation systems that have their own requirements. Areas for travelers' services, offices, commercial spaces, parking lots for cars and bicycles needed to be integrated in this tangle of infrastructure. The users of the complex comprise diverse groups of people including commuters, tourists, visitors and local residents. They all have different demands that without planning the foresight may find it confounding (Berkers, 2015 & Tesoriere, 2013). Old infrastructures need to be renovated in accordance with the development, such as the eight-meter underpass that is the only connection of residential neighborhood and downtown separated by railway. The limited access as physical barrier and also mental barrier emerged due to insecurity of the underpass during 90's, and authorities' actions to control the gangs and passerby were unsuccessful to increasing the security. Therefore, the main challenge of designers were not only solving the functional problems and enhancing access in various scales, but also restoration of urban life, relief, safety in station and adjacent urban space without interfering ongoing activities. Improving mental image of this urban node and associating with urban activities cause enhancing its situation through the interaction of the station and city (pic.5).

Accommodating chaos

Designers' team accepted the chaos to accommodate, instead of eliminating it. As they explain, the commission was too complicated. You could not possibly integrate all the needs in one building that would function well. Thus we decided to leave out the station building. We designed a square that accommodating the chaos. A terminal box, a common architectural solution for housing a multi-layered station, would have confounded a traveler's natural sense of orientation and safety. Squares, by contrast do not need much signage; you can direct people relying on sight lines or using light to attract their attention. Also a square is a logical outcome as one considers a durable way of connecting one part of the city with another that separated by the railways. By offering the users ample space, you simultaneously provide them with the freedom to choose to avoid each other as they move smoothly from A to B. In order to make the idea of a square work, a roof was essential not only provides travelers with shelter on rainy days, it also assigns every element of the complex a logical and recognizable place. It ensures that the station has equivalent and distinguishable entrances on both sides that connect indoor and outdoor spaces. Generating the station based on the "open plaza" idea caused in the flexible and multi-tasking space. As extended from indoor to urban space, interwoven of various scales of activities and transitions spread throughout the square, interconnected with northern plaza in residential fabric and southern plaza in downtown due to ongoing spatial experience of commuters.

Connecting inside and outside

Continuity and fluid space would be perceived by presence in the interior and indoor/outdoor connections. Pedestrian passage as the straight and flowing path at ground level starts from the downtown in the south, passing through the public and functional spaces, reaches to the northern residential neighborhood that composing main structure of the station. Beneath this passage there are metro stations, train stations above the passage and other stations as taxi and light train located at the east side in direct access.

The northern side of the station resumes interior space to urban space through transparent skin of the northern facade and immense opening to the residential fabric. Transparent roof of the platforms and glass facade of the entrance hall to the city center integrated the station with light and life of the city. Entering the sunlight to the interior space attaches the nature to the complex, and entails creating the diverse and changing public space. This enhances the station from a closed built space to a part of urban space.

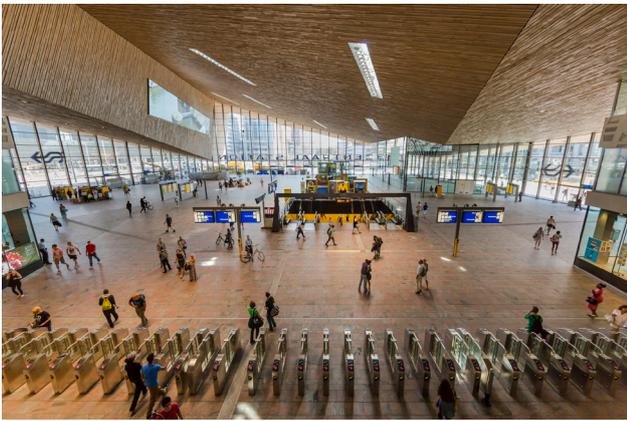


Pic5: Rotterdam Central Station as urban node.
Source: <https://en.rotterdampartners.nl/press/press-releases/cic/>.

The distinct cantilevered roof at the main entrance is recognized as a way-finder as it points toward the city center. The wayfinding function of the roof was not originally intended by the designers, the aim of extending the roof was to integrate the metro entrance in the building so that the travelers would be able to transfer conveniently from the train to the underground. By coincidence, the iconic gesture of the roof simultaneously became sign-post that points people to the right direction.

The station, a place to present not to pass
Prime areas of the station have been expanded due to renovation of the building and adjacent urban landscape, enhancing the interaction with the urban space by revising them. Designers declared that “new station and nearby urban space became larger, more transparent and organized than the older one, also considering it as a stop in HSR network and a motive in developing and renovating Rotterdam in regard to global approach (Berkers, 2015).

Northern urban space with natural landscape in local scale includes greenery, pool, pathways alongside the horizontal and transparent building of the station. The restricted roadways generating calm space harmonious to the historic residential neighborhood. By contrast, in the south, the folded shape of the steel roof in the vast scale of landscape interacts with the towers of down town in contrast and dynamic way. Appearance of this weird canopy that covers the immense entrance hall pointing toward the city, generates the characteristics of the station at the outset of cultural pivot of Rotterdam (Ibid). Following the passage to the station, floored with the red stone from the entrance to the platforms, links the outdoor and indoor as inviting through the glass facade. Indoor wooden surfaces make a welcoming and pleasant space for stay and roaming of the passengers (Ibid), and stretch the connection of landscape and pedestrian passage to the city that was inaccessible and undesirable before.



Pic6: The Idea of urban square in confluence of city and station. Source: http://www.domusweb.it/en/architecture/03/04/2014/team_cs_rotterdam_centraal_.html

In order to extending and improving the pedestrian toward the city, parking lots for 750 cars and 5200 bicycles were located under the entrance area, and service area of the bus, taxi and tram at the east side of the station. Roadway around the station area converted to underpass. Preferring the pedestrian to the roadways, railways and urban facilities generates the continuous access between the northern residential fabric and southern city center through the station, which balances between the large-scale of the downtown and human scale of urban fabric in urban landscape design. This achieved by the mid-scale and condensed urban activities that encompass the station and integrating the city and station.

Landscape design of southern plaza reaching the downtown, includes orderly planted trees in greeneries in between the pathways that framing the sight corridor, functions and event in the urban context. As flexibility of open space suits the accommodation of various functions and multiple community events through urban art and society participation, this leads to extensive flat open space that is bordered by the linear seating at the flowerbed edges.



Pic7: Extension of city and nature into the station. Source: http://www.domusweb.it/en/architecture/03/04/2014/team_cs_rotterdam_centraal_.html

City and railway interaction

City comprises of multiple components in various scales and functions, moving in the city by every transportation facilities makes the perception of the city as dualities of public-private, outdoor-indoor, dynamic-steady and sense-emotion, which associates our experiences with the environment. This experience gives us the measure to evaluate and explore the design of environment. Without various methods and scales of transporting available and interconnected to each other, it would be hard to generate the experience of “home” in the city that goes further than physical aspects and senses via memories and imaginations (Makower, 2014). Therefore, components of the city (as structure, residents and mental issues) are to be used in designing the environment not only as physical association to the place but also as the mental aspect of attachment and experiencing the place. In the living city, synthesis of the urban space components is not merely based on the making of access and connection, but also enabling the urban life flowing through the landscape, that depends on the synthesis of spatial variables via historic, natural and social infrastructures of the city, and their interconnections also lead to collective mental qualities.



Pic8 : Resilient space in meeting the urban landscape. Source: <http://teamv.nl/project/rotterdam-centraal-station/>.

Railways trespassing through the overlapping zones of the city, makes changes in the zone and functions periphery that “barrier effect” of them in the vicinity causes advantages and defects to the urban life that is known as “border effect”. Jane Jacobs in the “curse of border vacuums” section of her book, “The death and life of great American cities”, declares that similar, dense and continual occupations engendering borders in the city that in addition to creating physical barrier, also cause in social barrier by decreasing neighborhood relations. (Santos, 2011) Disruption in experiencing the space at the meeting of transport passages and urban fabric gradually makes the city strange to citizen.

Merging the railways in the city by methods like omission (as changing track, changing level, converting to underpass) is costly and unsustainable, and considers only the physical aspect of the borders without mental effects. Thus by converting the barrier imposed to the urban flowing into the connecting seam, integrates railway track and environment by interweaving it to the vicinity (Ibid).

Association of railway and the city in renovating the Rotterdam Central Station can be studied in multifaceted methods. Architects and landscape architects of the project views upon the role of railway tracks can be explained as below:

- Facilitating the access to railway services by urban transport policies.
- Improving the centrality of the station and multiple access to the tracks.
- Enhancing the transit station to the center of urban activities and flowing urban life.
- Synergy of passages capabilities in their juxtaposition.
- Decreasing the separateness of railway tracks by joining them to urban landscape.
- Priority of passengers’ station separation from the other facilities.
- As the role of the city in this association, it is mentioned:
- Accommodating and development of railways according to the urban landscape design.
- Reducing the environment pollution by well-locating and organizing the spatial hierarchy.
- Reducing the abandoned components of the urban infrastructure.
- Spatial and functional flexibility in the passages cross.
- Organizing the passages margins in favor of public space.
- Integration of urban landscape in borders through functions, sight corridors, nature and impression of social interactions.

Conclusion | Urban landscape comprised of urban infrastructures that includes dynamic urban flows, achieving favored urban landscape would be possible through holistic approach toward the city. Meanwhile, the interaction of various scales and layers matters that contributing to the generation of the city. Overlapping of these layers at the urban nodes and urban borders that occurs in crossing the intercity transport infrastructure and urban fabric, intensifies experiencing the changing of scale, function and mental image. Interaction between the composing layers of the city in this overlap, is possible by multifaceted

association of space and context, considering the relation of people and urban landscape components.

Landscape approach to the renovation process of Rotterdam Central Station led to generating an urban node in overlap of old urban fabric and modern city center that creates the urban square open to the urban life. Associating the flowing urban processes, also improving urban identity and synergy between the layers of urban landscape. Organizing and companionship of various aspects of presence and passage of the people, as perceiver and generator of the space would be the main core of this process.

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