



Cover image of the exhibition "Mission Île de la Cité le Cœur du Cœur. L'Île de la Cité à l'horizon 2040" Paris, 2017

Underground hubs. Connecting soil and subsoil.

Amath Luca, Diatta, Politecnico di Milano

The research is a study about the existing city and the future one - built and to be built - whose development is located below the ordinary ground level. The focus is on the subsoil, a part of the city, often very extensive and articulated, that contributes to the offer of public space in the contemporary urban dimension. The study is based on a period of time starting from the second half of the nineteenth century, with the birth of the first underground transport infrastructures and the need to move large crowds during the universal exhibitions in the European capitals. These big towns are rooted in history and are configured as stratified territories, from ancient times to modernity. Other cities of more recent development, such as the North American ones, are linked to modern and contemporary “infrastructuralisation” and the provision of strategic and commercial services linked to the use and enhancement of flows. We then find the Asian megalopolis with their unstoppable transformation along the years. These models of cities represent a contemporary area of research about alternative uses of the subsoil.

Underground hubs, located in many international metropolises, are models that combine and systematize the flows with the levels of the city, in a framework of public space offer that is both performative and contemplative. These spaces that link the ground with the subsoil become areas of research and experimentation, in a multi-scale perspective able to relate cities, underground infrastructures, interiors and instrumental equipment. A first consideration highlights how the generation of interconnection spaces, between different infrastructure hubs, leads to the identification and subsequent design of spaces connected to them. These constitute an extension of the city in the subsoil through services and places of gathering, acting as filters between the city on the soil and the one on the subsoil.

The aim of this research is to define a framework on the issues involving interlinking spaces in the underground hubs, and the relation between soil and subsoil. So how does the contemporary design interact with levels, flows and networks in an underground context? To answer this question the research will focus on emblematic cases that allow to understand how the descent of cities underground is the result of morphological implications and cites evolutionary processes. Samples of it include, over the years, Rome and Naples with their great archaeological finds and the rush to infrastructure, Paris with its complex and articulated underground city, London and New York City with their branched metro systems and many others.

A number of specific case studies have been selected to support the research, including Paris with the Carrousel du Louvre and the Forum des Halles, New York with Calatrava Ground Zero Oculus, Rome and C Line metro stations, London Jubilee Line Canary Wharf station, Naples with Piazza Garibaldi hub by Dominique Perrault. These are all examples of the strict connection between different levels of an evolving city and the dense networks that cross it.

Part of the references used to argue the research are scientific articles appeared in field's magazines which focus on studies investigating innovations in technology and design related to the use of underground spaces. We then find a large body of monographic works describing artefacts in line with the theme of underground hubs: different writing approaches to the theme and points of view that allow to carefully analyse architectural works of relevant importance for the development of cities. The research will also attempt to convey the intrinsic value of the subsoil through some references to the literary world.

A different perspective is given by international exhibitions investigating the subsoil held over the last 20 years. Among these there is Mission Île de la Cité which came to life in Paris in 2017 thanks to the studies carried out by Philippe Belaval and Dominique Perrault that shows numerous design reflections for the central area of future Paris. The exhibition shows a city that does not stop at the surface and continues underground where activities, transport infrastructure and pipelines are concentrated. The projects on display propose a city that descends, populating the subsoil and playing with flows and heights, involving infrastructures and buildings. The challenge posed by Paris for 2040 becomes an important reference point and leads to think about its feasibility in other urban contexts.

The final point of the research will be the demonstration and explanation of the processes leading to the definition of projects for underground hubs involving flows on different levels. The focus will be just on the connection tools between these levels and different points of the city, investigating the upper and the lower city. It will also make -those who are interested in the research results- aware of how the careful and planned design of underground space directly affects the surface, explaining the indissoluble interconnection between soil and subsoil.

Bibliography

- Cho, Im Sik, Chye-Kiang Heng, and Zdravko Trivic. 2015. *Re-Framing Urban Space: Urban Design for Emerging Hybrid and High-Density Conditions*. London: Routledge.
- Dell’Aira, Paola Veronica, Andrea Grimaldi, Paola Guarini, and Filippo Lambertucci. 2015. *Sottosuoli Urbani. La progettazione della città che scende*. Roma: Quodlibet.
- De Cesaris, Alessandra. 2015. *Il progetto del suolo-sottosuolo*. Roma: Gangemi Editore.
- Sterling Raymond L., and John Carmody. 1993. *Underground space design*. London: Van Nostrand Reinhold.
- Macaulay, David. 1977. *Underground*. Roma: Armando

Design Driven Research

Keywords_ Urban | Underground | Hub

The research is based on a methodology that takes into account several aspects related to the issue of underground hubs by putting into system existing specific literature, historical documentation, the involvement of the main actors related to the object of the research through the creation of meta-projects that can be applied to possible scenarios. The research will open with the identification of precise case studies in which the redesign of schematic project sections and plans allows to compare the different solutions analysing them through a taxonomic design investigation. Only through the observation of the sections is it possible to perceive the complexity of the different interconnections. In parallel, interviews will be conducted with the actors involved in the design, that will allow to clarify the issues related to the choices made by contractors and designers. The research will continue with the study of existing literature in order to provide a basic knowledge to help understand the features of subterranean spaces and the design of underground hubs. In the last part of the research, meta-projects will be outlined: this will highlight the different design approaches to the theme. Numerous projects involving other fields such as art, museography and archaeology will be considered. The process described will lead to the definition of possible applications to existing projects. The commitment will thus be to investigate which contexts can directly experience the research results in order to see a practical application.

Bio

Amath Luca, Diatta, PhD program Architectural Urban Interior Design / Politecnico di Milano; 11 months research; amathluca.diatta@polimi.it; I graduated in 2017 in Architecture and Conservation at the Politecnico di Torino with a thesis on design/history in partnership with ENSA Paris-Belleville. Afterwards I attended an Itinerant Master's course in Museography, Architecture and Archaeology, approaching the field of exhibit design. The knowledge acquired has been consolidated through professional collaborations for the conception and design of exhibitions and events at national and international level. I am currently a first year student of the PhD program AUID at the Politecnico di Milano. My research fields involve design on several scales, with a particular focus on the quality of interior spaces.