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## The Transportation Engineering inside the city structure in the Science Fiction Graphic Novel of the 20th Century

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### Abstract

Comic books, graphic novels, bandes dessinées in France, Fumetti in Italy, Tebeos in Spain, etc, are only some of the names given to the ninth art in the world since their first representations in the Ancient Egypt times. In these last decades it has transformed itself, from just a children entertainment of little intellectual value, and now it belongs to the best family of universal literature. Just as the other arts, painting, music, poetry, cinema..., it has become another way of expression of the human being, who often reflects on his master pieces the compendium of the feelings and thoughts of a whole generation, an epoch, or even sublime states of the soul, capable to transmit, in just one masterpiece, the essence of our nature to the next generations.

These artists, the comic's ones, the same as in literature or cinema, have also tried to represent, not only the past and the present, but also the future of the human being. Doing sometimes prodigious imagination efforts, they have constructed utopic, distopic, extra-terrestrial...scenarios, designing realistic or impossible science fiction backgrounds, which will finally influence all of us, as intellectual beings that we are, in all our disciplines, just as the other arts do. And one of these disciplines is, of course, the science of transportation, in all its aspects.

Willing to approach all these questions, we began a long investigation journey which will end in a doctoral thesis with the title: "The Civil Engineering in the Science Fiction Graphic Novel". In this article we anticipate and summarize a small sample of our thesis, including some of the most important aspects of the mentioned investigation as well as the obtained conclusions.

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## 1. Introduction

For the completion of the doctoral thesis, origin of this article, 30.000 of comic references have been analyzed, in order to determine the frame of influence of the European twentieth century comics in the transportation engineering and vice-versa. Based in this obtained data, the thesis will study the results of these graphic propositions, describing the possibilities of taking them to reality, explaining the technical challenges they suggest and study it under the light of the engineering.

## 2. The Transport inside the urban structure of the city and its road accesses.

As an example of the way of study proposed in the thesis, it will be explained, in this chapter, the results of the analysis of the comic art in its proposals about the transportation in the city, all of it in the comic proposals as mentioned before.

A city can be defined, roughly, as housing and activity buildings for the human beings, tied by roads, which are the ways we use to move across this city, by foot or on vehicles. In this very simplified definition, take place however, infinite combinations and configurations which define the personality of the cities and their transports nets along the human history and its geography. The comic creators have found an endless fountain of inspiration in representation of this hypothetical future, giving us the opportunity to meet conceptions that could be (or not).

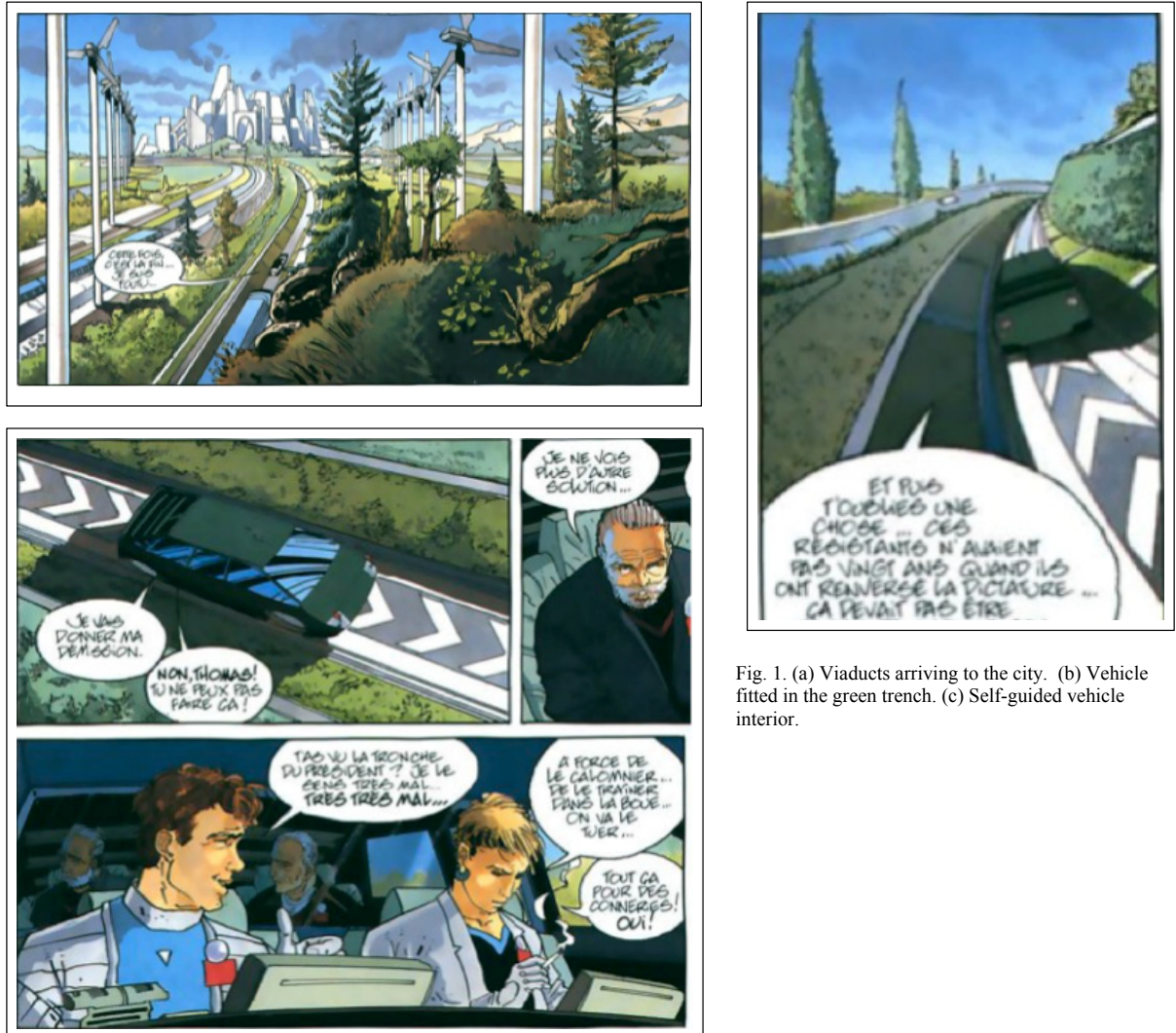


Fig. 1. (a) Viaducts arriving to the city. (b) Vehicle fitted in the green trench. (c) Self-guided vehicle interior.

### 2.1. *The self-guided vehicle in a one-lane trench.*

The previous figures show the arrival of the roads and railways to a big city which the author places in the year 2082. Well integrated in the nature we can see several roads and tracks. The green car of the picture moves self-guided or maybe radio-guided. There are no drivers and the vehicle finds itself fitted in a trench surrounded by plants, with no danger of any accident, because the mentioned self-guidance system controls the distance between vehicles in the displacement line. Once the vehicles arrives in the city, it “frees” itself of its unidimensional tie in order to move freely again in the two dimensions.

### 2.2. *The over-populated city: Viaducts at different levels.*

It is not necessary to be a transport specialist to understand that one of the most important problems of the cities is the space dedicated to the vehicles driving through them. From the Haussmann Baron, the Ensanche Cerdá in Barcelona or the Castro Plan of Madrid, all the great city designers had to use their knowledge to assimilate the exponential growing outflows of vehicles in the big metropolis.

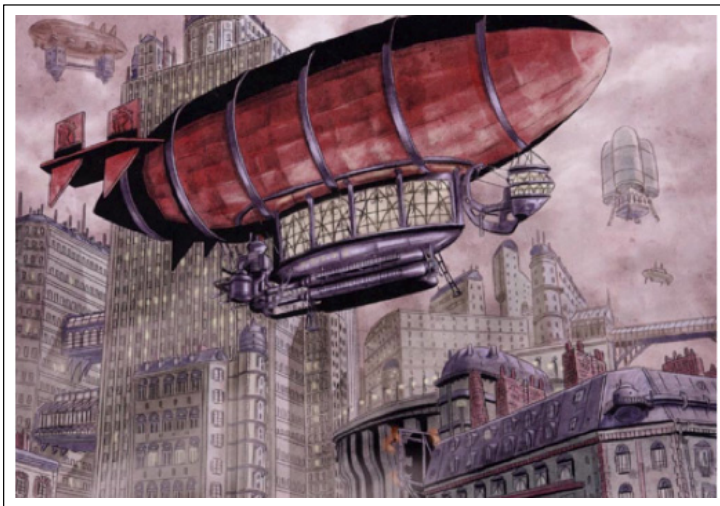


Fig.2. High placed viaducts crossing through the buildings

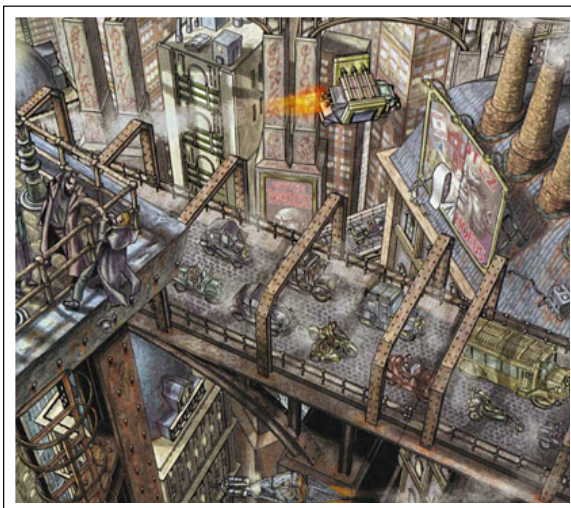


Fig.3. Picture of a viaduct very high constructed over the city



Even today, the giant Asian cities as Bangkok, Jakarta, Tokio...must construct viaducts at different levels in order to canalize the pedestrian traffic, the light surface trains, the cars, the trucks and the dense cloud of motorbikes crossing those latitudes. It is not risky to say that the proposals of the following comic writers and illustrators are with no doubt pretty realistic, imaging a many floors city of the future, where all kinds of traffic are put in order by different layers crossing the buildings.

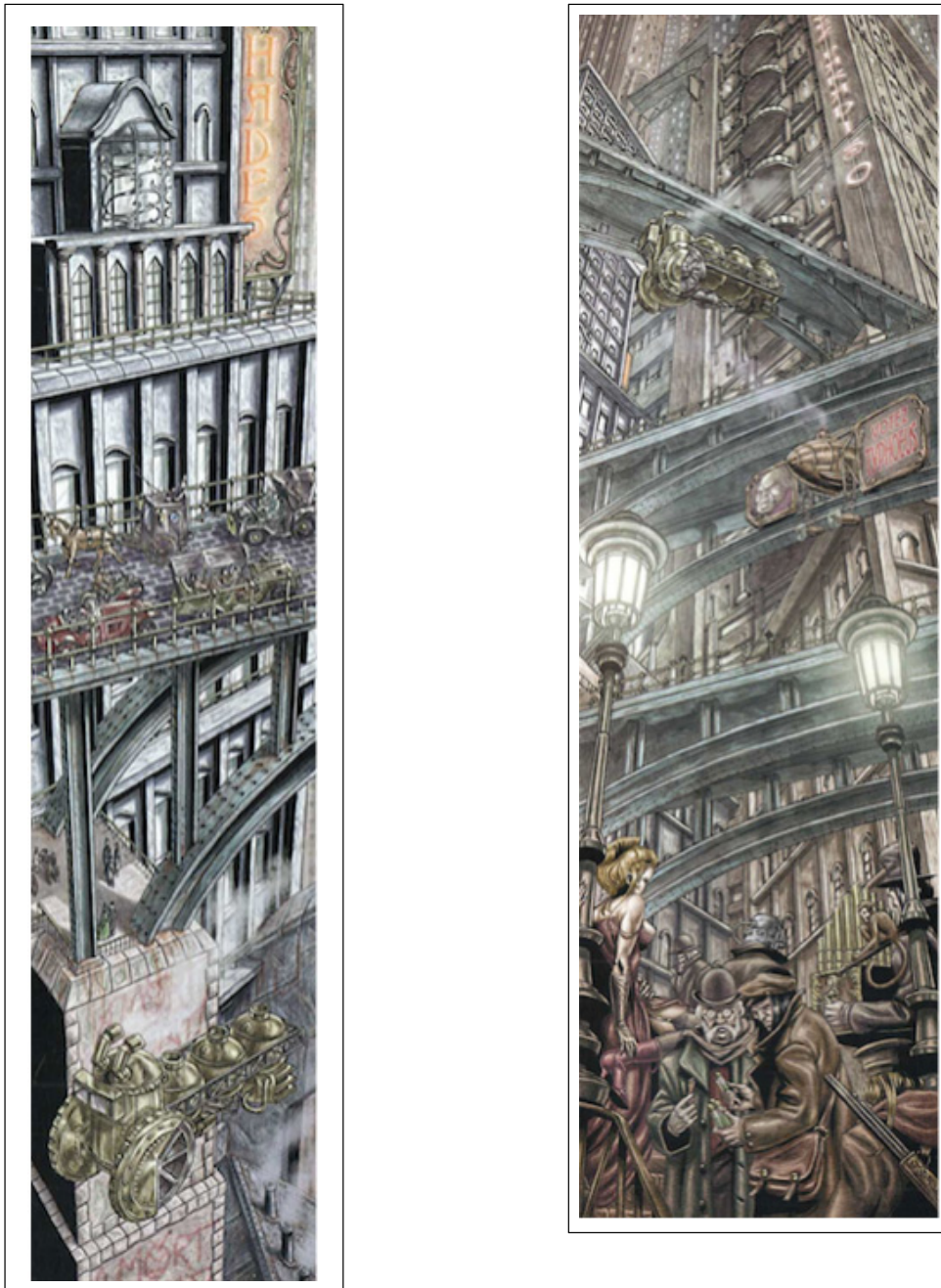


Fig. 4. (a) Traffic road over the city; (b) Layers of traffic circulation.

The deepness of the cities shown by Corbeyran and Moreno produce an uncomfortable vertigo sensation. We can never see the surface level and the characters of the story seem to move always in the heights. But, despite finding themselves in the future, all the vehicles, building structures and details seem to be proper of the building aesthetics of the 19th Century, the riveted structures, the paving stone streets, the brick chimneys of the factories, always fuming... Even the vehicles, despite flying many of them, have an hybrid design, with one foot in the future and the other one in the first models of Henry Ford. In Fig. 4 we can count five different layers of viaducts, entering even inside the heart of many buildings.

The vehicles: Horse coaches with metal carriages, giant dirigibles of all kind, with their enormous booths and aesthetics of two hundred years ago, apparently steam engines like old English locomotives and, despite it, flying ones. This necessity of dividing the city in layers is very usual in the representation of the urban future in the graphic novels. Also Moebius, the famous French author, as we will see afterwards, uses this solution to create asphyxiating universes in impossible cities which, most of them, grow toward downward, burying themselves in the subsoil of inhabitable planets due to the contamination, the radioactivity or to be protected in the eternal wars they suffer.



Fig. 5. Nose dive view of the pit-city and its roads between buildings.



In this example we hereby propose, in Fig.5, The Incal, one of the masterpieces of the kind, in which the plot happens in a city constructed towards the center of the planet.

In this nose dive view of the John Difool fall, its principal character, we can see countless floors that get lost to the view in the depth. The roads and streets seam together the buildings, superimposed the ones to the others in this claustrophobic vertical groundless world. And we say groundless because the basis of this city is a cloaca water sea, acid and radioactive, without control, where all the waste products of the city finish. The analysis of how is it possible the wildness of this waste management will be studied in another chapter of the mentioned doctoral thesis. We include nevertheless a figure of what are we meaning to illustrate it. We can see in it the place where our main character will fall after being pushed over the bridge



Fig. 6 Acid ground of the pit-city.

The basement of the city, unable to evacuate the residues of hundreds of millions of persons, is now covered by a poisonous sea where hundreds of suicides jump every day. As we can observe, our hero has been saved, in extremis, of falling in the acid sea by a small flying vehicle.

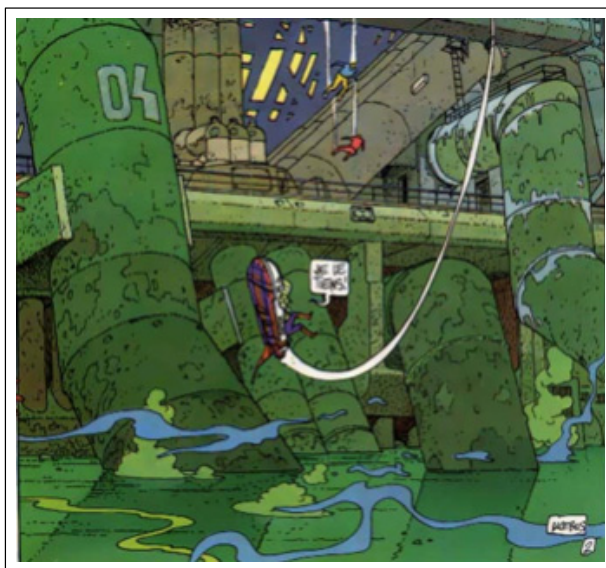


Fig. 7 Ground of the pit-city.

In this same city, not only the ground vehicles cross the streets, there is also a dense traffic of cars, buses and all kind of devices that fly across the air more or less in order, managed all of them through a net of traffic signals with semafores just like today. We can appreciate again the traffic superimposed layers, ordered in invisible transport networks crossing the city.



Fig. 8. Air traffic management in the future.

We think that the authors have perfectly described what could be of the cities of the future by exaggerating the defects of today's big metropolis. We conclude that the main characteristics are:

**THE VERTICAL PIT CITY:** The city grows downwards, not upwards, maybe because the atmosphere is not breathable anymore, because the sun beams are too dangerous because of the disappearance of the ozone layer, because they need to protect themselves from exterior attacks...

**TRANSPORT NETWORKS IN LAYERS:** The depth of the city is so important that the levels of pedestrian, ground vehicles and flying engines are countless. More or less ordained, these layers or levels give structure to the city. This proposal is not impossible at all. As we have remembered before, some of the big actual metropolis have already constructed several levels of traffic movement, superposing the ones to the others in a picture that, specially by night, is not so different of the ones showed by Moebius.

**IMPOSSIBLE MANAGEMENT OF THE SANITARY ENGINEERING:** We don't need to search in hypothetical futures to find macro-cities flooded or overwhelmed by their own dregs and industrial residues. Several African and Asian countries are nowadays unable to bear population growths that collapse completely their fragile sanitary structure. For example, the Ganges or the Mekong rivers are in some spots not very far away from the apocalyptic

pictures we can appreciate here.

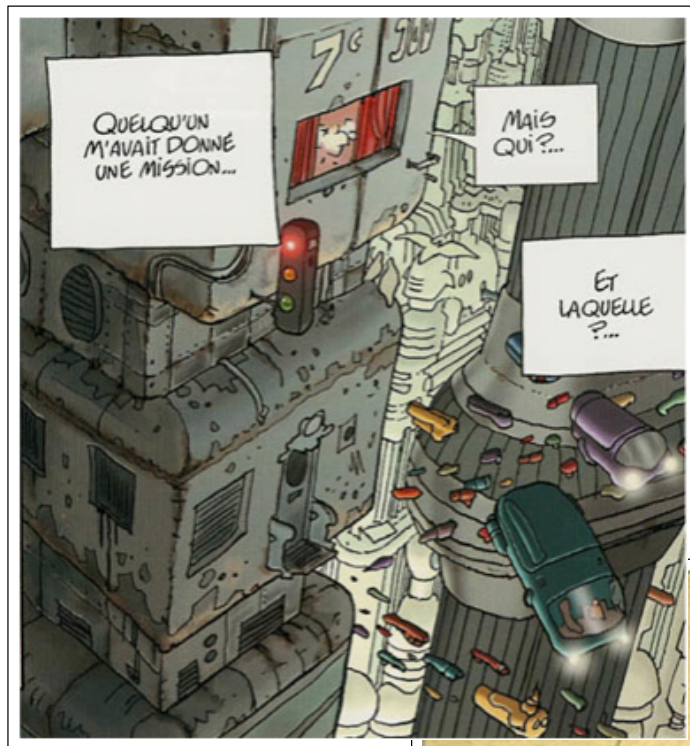


Fig.9. (a) Air highways crossing among the buildings. (b) High placed road over the city.





### 3. Conclusions

The images proposed in this paper, assisted with some brief descriptions and their analysis, are only an insignificant sample of the content of the above mentioned doctoral thesis. I believe, nevertheless, that only with them the importance of this study has been evinced: The graphic novels or comics, the science fiction ones, are a more than interesting source for the engineers, because it allows us to enlighten how the transports and their influence in the cities could be in distant and not so distant futures. If quoting Jules Verne and his influence in the latter engineers is unavoidable, we will find now ourselves, with no doubt, in front of the artists that effectively predicted our future, leaving this information within reach. And we thought they were children amusements...

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