

Professional scientific sessions for art, architecture and urban planning Thursday evenings

Held in: Conference hall of Herampey Consulting Engineers

Date: 11.05.2018

Title: The role of simulation on Tehran transport field.

Speakers and panel members: Mr. M. Arbab and Mr. S. Mardani.

Mr. Arbab began his speech posing a question regarding the simulation. He explained that simulation is reporting through a process, a real thing or a social condition. The tools and the manners used to analyze, compare, improvement of complex systems, are repetitive. Mr. Arbab that sometimes the use of mathematical models in particular case is possible and preferable, but in many cases their use is inappropriate and here the application of simulation comes to solve the problem.

Mr. Arbab explained that simulation is the technology to improve the operating systems, safety engineering, training and testing of the entire process that is considered.

Continuing his speech Mr. Arbab reported the example of driving training, when during different courses in some case it's not possible to create really a dangerous situation, in order to teach and prepare the trainee to react in the appropriate way to the created hard situation. Situation that are not subject to be created in the real world are created through simulation that is an easier and justified tool and manner to achieve the desired results.

Talking about transport systems and how they are complicated and interrelated, because of their continuous growing on forms and content, Mr. Arbab said that the main reason of the use and application of simulating systems, depend on the nature of the transport system. Mr. Arbab explained that simulation modeling of traffic sphere includes a wide range of different fields like the evaluation and decision making regarding the foundation of infrastructures and engineering corrections, evaluation regarding traffic specific areas, like limited circulation or restricted areas. Also the organization of BRT bus transportation system, that comprehends bus and metro coordinated exploitation. Cases regarding pedestrians, the construction of crossing bridges, bicycle routs, urban lighting systems, traffic smart control, evaluation of environmental pollution and the consumption of fuel are problems that can be studied applying simulation systems and solutions.

Regarding simulation programs and systems on traffic matters, Mr. Arbab soft wares like AIMSUN and EMME that are widely used in traffic smart management, transport programing, passenger and logistic terminals management, analyze of safety matters, transport management, organization of BRT lines, study of the existing and future infrastructures, programming of traffic lights, evaluation of ITS projects and systems and also study and analyze of drivers' behavior.

Talking about the share of transport in Tehran , Mr. Arbab explained that 30% is metro and bus share,18% taxi share,8% minibus share,10% motorcycle and bicycle share, 31% private cars share and 3% others' share.

Mr. Arbab concluded his speech presenting the advantages of using simulation systems as an operative tool, stressing that it can focus on problems of the future that somehow are invisible. The use and application of simulating systems help to have reliable results limiting the costs in terms of money and human resources. He also talked about possible lacks and deficiencies that exist in any tool and system that are made to ease our lives through their application.

The second speaker was Mr. Mardani. He presented some simulating tools and their operating systems. There are simulators called general simulators that are the languages of the simulation. Through the use of these languages is possible to simulate any systems existing in the world, having general and common aspects. Through new achievements exclusive tools have been created for simulation, one example is traffic or transport related problems, that had to be faced by the municipalities, consulting engineers and urban management organizations. Mr. Madani explained that if the mentioned organizations wanted to use general simulating tools for specific problems, the entire process would be very long, expensive and with a lower quality compared with the specifically created simulation programs. The software for traffic related problems is called Ericsson, there are also other software that have been designed for special purposes like simulating traffic problems, one of them belongs to a team of Barcelona University and actually they are considered one of the best companies in the world having 8 offices and 4000 employees around the world. The company has cooperated with municipalities of Montreal, Paris, Tokyo, Iranian cities like Isfahan, Shiraz and Tehran, helping them to solve the problems regarding the urban traffic.

Mr. Mardani explained how these simulating programs are used for the problems that they are facing and of course they must receive the necessary information in order to offer the appropriate output. Thanks to the ongoing development and achievements of IT field, the operators on the urban management everyday have new possibilities to use easier and effective tools to improve their operations and results. Programs used for this purpose are Google map, Google earth and Open state map. Through the use of GIS file it's possible to have the desired plan of streets and urban network, adding consequently the necessary information needed for the simulation. Mr. Mardani explained that using this software it's possible to introduce bus lanes, subway stations, pedestrians routes, posing questions regarding the possible journey that we intend to realize in an urban area and the simulation tools helps us to understand the problems and the advantages that such journey can have and how to avoid the problems and enjoy the advantages.

Because the participants to the session better understand how the simulation software works Mr. Mardani explains in a practical way which are the consecutive steps in order to feed the program and how the program gives the consequent result in base of the information that was introduced. In this process the parameters are the functioning of the traffic lights and their timetable, the flow

of the pedestrians. Another example was the simulation of the pedestrians and cars flow in the Barcelona stadium and how the simulator gave the best solution to reduce the circulation problems. In this program the organizers can choose the best solutions in order to direct the entrance and the exit of the fans and one of the most important things is how the fan can reach public transport, creating the minimum problem and waste of time.

Another program that was presented was the Aimsun company's project titled LRT, regarding Sidney, and how through the simulation it was possible to see the effects on the journey time reduction. The positive results of the simulation and consequently the practical realization is that public transport users are convinced and encouraged to use it, because of evident advantages compared with other transports.

Mr. Mardani presented a program called TOD (Transit Oriented Development) where the public bus transport is matched with the Tramway service. The program permits to calculate and organize transport vehicles, in order to save time and permit the users to change and get the following transport (bus or tramway) without loose time because of a disorganized timetable.

Mr. Mardani presented a program from the same company (Aimsun) regarding airports activities, where the organization of different service providers is absolutely vital for the functioning of an airport that must satisfy passengers' needs and priorities. The activities are divided in pick hours and normal hours, the program can consider weather problems that can cause delays.

Mr. Mardani explained that the advantage of this software is that the user doesn't need to be a computer professional user and all the mechanisms and steps are eased in order to facilitate the operations by a beginner computer operator.

One of the most important things that must be considered in all places that there are large concentration of passengers, are the emergency exits and evacuation cases. The program can help the managers of the system to identify which areas and points are subject to more stress and need more attention to facilitate the exit or evacuation.

Mr. Mardani concluded his speech saying that in all the cases that he presented the most difficult conditions and situations regard the airports, because many factors can influence negatively the functioning of an airport, and this is the reason that the experts concentrate their attention on their operational perfection.