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Evaluation effects of establishment high rise building on urban water infrastructure ((case study: Qazvin city))

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Abstract. In this century establishment of tall buildings is the phenomenon that considered as solution for prevent the uncontrolled horizontal expansion and a way for provision hosing for urban household Tall buildings in the city can act as a major factor in solving urban hosing problems, if they planned correctly. But this phenomenon if located on incorrect position can face the city with the numerous problems. This problems include traffic tie-ups, fracture in provision of urban infrastructure facilities and equipment that they needed by the resident of the city. Ecological pollution and impose of ecological pressure to the urban district Final goal of this project is examining effects of establishment tall building on provision urban infrastructure consists of urban water. On this way two model of establishment tall building in the world (Chicago & conservectivism) and their case studies (Poonak site & Palestine site) in the Qazvin city are compared with each other and finally the optimization of each of two model distinct in provision of urban infrastructure facilities.

Keywords: High rising, water infrastructure, urban infrastructure, water pressure reduce

1. INTRODUCTION

Among current and recent issues in world cities, especially in big cities that raised as polyhedral matters, is high rising issue. High rising phenomenon in beginning rose for better exploitation from city centers, because tendency to density and centralization of economic units was increasing demand for land in city center. In other hand supply of land in this country of city was very limited. Consequently increasing of building density offered as a solution for increasing level of substruction. This solution used in vast level and rare caused residential land use in addition to economic land use like industrial, administrative and commercial land use and transmitted to suburban country. But this solution as well as other solution had negative consequences and effects and create new problem for citizens that among them can be noted to increasing density and crowd, environmental pollution increase, citizens accessibility decrease to weather and sunrise and increase the city troubling[1]. In our country high rising also as a solution had such consequences and this while that need for high rising also be. Therefor it is necessary that guidance, principles and criteria pontificated for eliminating and balancing the badly consequence of high rising, and acts after approval of authorities. In this regard unsuitable determination of high rise building location can be caused to important effect in decreasing peoples urban infrastructures. In beginning this paper two usual construction patterns of high rise building in the world introduced and then way of supplying urban water infrastructure needing for each of this two kind of building is checked.

2. URBAN AND SOCIAL THEORIES

With attention to high rising theories, different ideas that different school explaining about this phenomenon can be concluded:

1. High rising incompact and close to each other from avenue.[2]

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2. high rising "in sporadic in to green space from, and far from avenue modernism schools".
3. Dense residential high rising including minimum private space and maximum public space, conservectivism schools.[3]
4. Titanic's high rising in a city dimensions based on extra ordinary complex and costly technologies by title of mega structure or massive structure. Among this theories in the field of high rising.

1 and 3 cases namely Chicago schools and conservectivism, had selected.

Chicago method based on construction high rise building in high dense from and into constructed countries inside cities. Conservectivism method based on highrising in form of highrise complex into the outside city district and into arid lands.[4]

3. DEFAULT AND TARGETS

Main target of this paper is checking optimization level of each of two methods in urban water infrastructures suitable peroxidation. In this way, two case studies in Qazvin cities "Palestine site" based on Chicago school and "Poonak site" based on conservectivism method in arid countryside district had compared with each other. In this paper assumed that conservectivism method hold better operation in keeping security urban water infrastructure check.[5]

In this topic, ways of providing urban water infrastructure had checked. First computing and then optimization of each of two methods had explained.

In global network water of Qazvin city, the period of this plan was 25 years and this is planning for 715000 persons. Also in this plan water consumption of Person was 242 liter in one day, daily consumption factor is 1.4 liter and hour factor determined 1.5.In calculation of providing water for this building, EPAnet software used. In this software we could at least with entering of increase the population in case study compute the consumption of water current flow.

This can be reached with two methods:

Increasing water current flow = hour consumption factor × population increase daily consumption × factor water consumption capitation

In this method diameter of pipe computed based on velocity in network and then by relation of pipe drop in network, deal of water pressure drop in network by this population increase will compute. When this drop is high should be prevent from increase of population in area.[7]

Basic formula that used in this software is "Hazen – Williams head loss":

$$H = \frac{4.727 L Q^{1.852}}{d^{4.871} C^{1.852}}$$

In this formula:
H = Headloss in feet
Q = Flow in cfs
L = Pipe length in feet
d = Pipe diameter in feet
C = roughness coefficient (Hazen- Williams C-factor)[6]

After computing and knowing deal of water consumption current flow this amount of current flow entered in software and software can show the hydraulics computing conclusions include velocity, decreasing pressure in pipes and so on. In this selection, two case studies were compared with each other from dropping the pressure of water in urban water infrastructure.

3.1. Palestine site high rise building

In this method in figure 1 you can see the level of water pressure in Qazvin city. At first could said that because this buildings have 300 units, with considering means of 4 person for each family that live in this units, the hole person that live in this units, the hole person that live in this high rise building are 1200 persons. When 1200 person population added to resident persons in this district, amount of drop water pressure in pipes of this district of city and the whole dropped water pressure in Qazvin city had shown.

First water consumption current flow for 1200 resident in this high rise building must be computed:

1.5×1.4×242×1200÷86400=7 liter per second

For 1200 person increasing population 7 liter per second had added to amount of current flow water consumption. When entered this current flow to software and did the computing, figure 2 that shown amount of water pressure drop in Qazvin city could be reached. After compare figure 1 with figure 2 this conclusion had reached that amount of drop water pressure in side of high rise building in Palestine is very low and this amount of pressure lose cant cause big drop water in Qazvin water infrastructure.

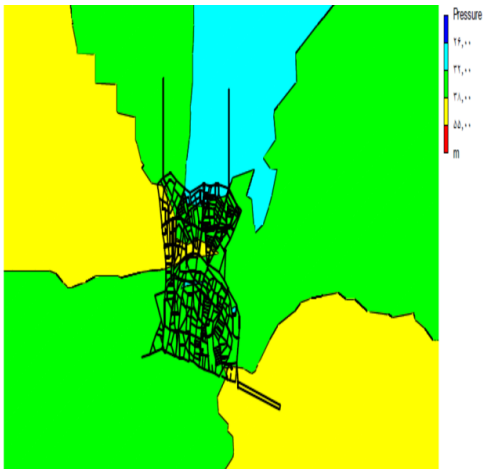

Figure 1. Plan of distribution water network in Qazvin city.

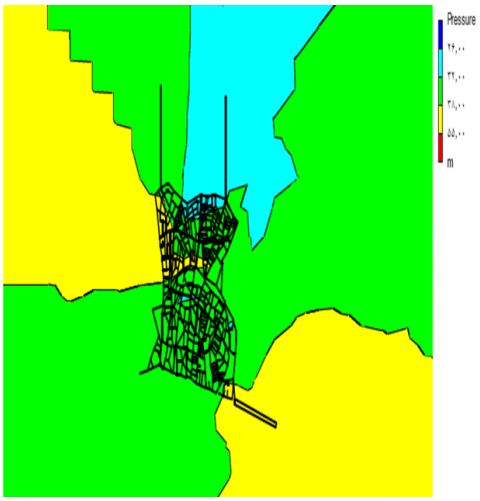

Figure 2. Plan of distribution water network in Qazvin city after adding population about 1200 persons.

But attention to this note is necessary that this problem can be cause to decrease amount of piping life ages.

3.2. Poonak high rise complex:

Figure 3 shows water pressure level in water piping network in Poonak district. First must explained that number of units of this high rise building is about 1200 units. If considered that 4 persons live in each unit, 4800 persons live in Poonak high rise complex. When 4800 persons added to current person that lived in Poonak district amount of water pressure drop could be seen in figure 4. Amount of water consumption current flow for 4800 people that resident in this high rise building computed:

$1.5 \times 1.4 \times 242 \times 4800 \div 86400 = 28$ Liter per second

Shown that 4800 person increasing population, 28 liter per second added to city consumption water. After enter this amount to software could be seen that decrease of water pressure in this district is very intensive.

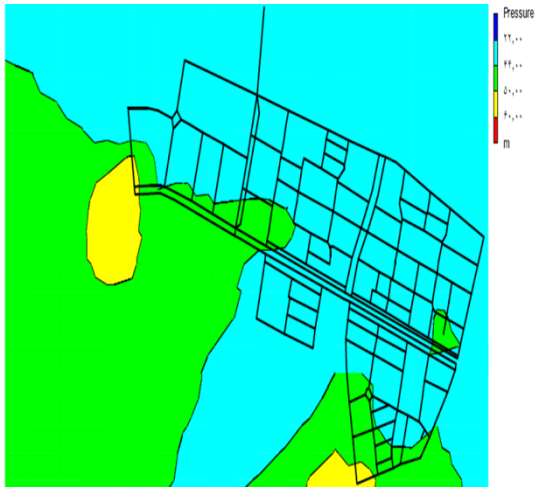

Figure 3. Plan of distribution water network in Poonak site.

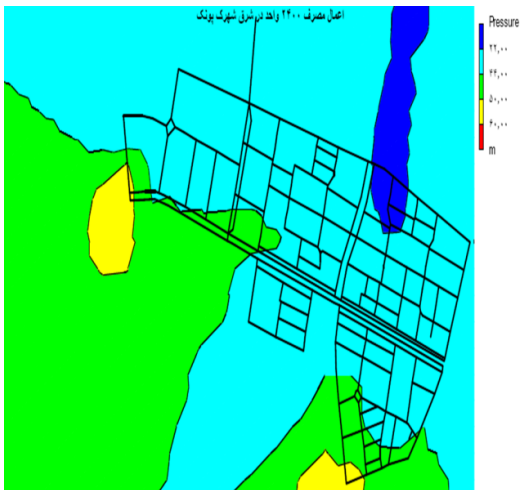

Figure 4. Plan of distribution water network in Poonak site after adding population about 4800 persons.

5. CONCLUSION

In relation to water consumption of people that resident in Palestine high rise building, with this addition to population by persons using that live in this building. District of case study, don't have reduced water problem, but if population increase in this country of city, other country of city would have very problem for supply water. This kind of establishment because located in dense district of town, could be imposing a lot of economic damage to hole of city. Also matter of decrease the final age of piping mechanism in city is very important for locating high rise building.

In other hand unlike Palestine site in Poonak site, if optimization supply water for residents considered could supply the water demand of each high rise building that built in such this sites. This matter proved optimization of conservectivism method against Chicago school theory.

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