World Academy of Science, Engineering and Technology
International Journal of Geological and Environmental Engineering
Vol:5, No:11, 2011

Urban water Management at the Time of Natural Disaster

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***Abstract*—**since in natural accidents, facilities that relate to this vita element are underground so, it is difficult to find quickly some right, exact and definite information about water utilities. There fore, this article has done operationally in Boukan city in Western Azarbaijan of Iran and it tries to represent operation and capabilities of Geographical Information system (GIS) in urban water management at the time of natural accidents. Structure of this article is that firstly it has established a comprehensive data base related to water utilities by collecting, entering, saving and data management, then by modeling water utilities we have practically considered its operational aspects related to water utility problems in urban regions.

***Keywords*—**Natural Disaster, Geographical Information system (GIS), Modeling and network analysis, Boukan city in Western Azarbaijan, Iran

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I. Introduction

THE water problem is the most important effects of the natural hazard that involve people results this problem the people safety is in threat before and after the fracture damage water source such as spring, wells, aqueduct's breaking ground source and aerial and breaking the source of drinking water and sewage tubes and damage construction and pumps that always confront with cutoff electricity and have been discomforting for habitant and can create environmental problems for government. Cause of water shortage and penetrate unclean water and sewage to the water source moreover the something effected that have efficacy on the (watery animal) so the (trauma) people should refer to broadcast the water malarias in the location. Result of water has main important effect in the direct or indirect or indirect bawteria malafies a palsy, cholera, maby, chemical venom etc…

In periods that natural hazard occur one of the problem in water urban management in tend the expanse the network and water and sewage construction and unreachable to correct tender, confident information because of the importance of reach the information and lock the perfect an confident information we should pronto use the CIS with the planning tally the standards to collect data [18].

II. Research Methodology

In this research we after the collect unpractical data depend user relation and distribution network and maps related to network water distribution to import format and enter data to system and after did the database management with modeling in GIS girth stage did the different analyze water network distribution and in the end we reach our work results (Fig.1).

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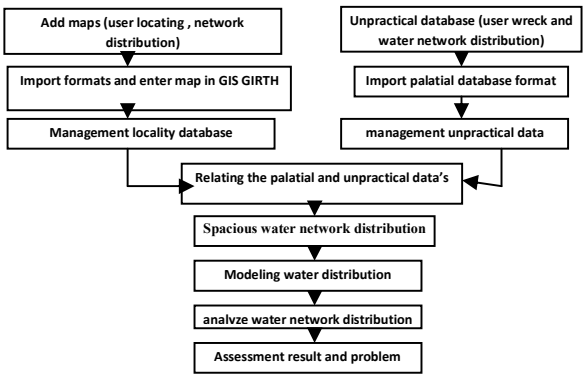


Fig. 1 water distribution network modeling process

III. Search Implement

In this research have been used of this data

1) Base map of the city in scale of 1:2000 that provides with the topography organization of Iran
2) Maps of the water distribution in scale of 1:2000
3) Paper map's of the users locality that provides with the sewage company of the Western Azarbaijan
4) Map of the refinery
5) Map's of sump
6) Map's of pomp's station , tube and continuity

IV. – Concept's

A. Data, information and information system

In the first we should study explain of concept and information because of their importance. Data is the explain of quantity of phenomena's characteristic and information is results of the processes that we do on the data's for gain the communication and depending in the data structure in the to this definition, information provided of processing data, the auxiliary instrument that have been using for select and processing systems that idiomatically are met them information system. ordinary a information system is inclusive the continuum of different stages , in gain data to analyze an use of them in decision processing [13].basically information is the first element in the ever planning but with the tremendous increase of the information mass in modern the problem of their order is in discuss [7] nowadays all of the urban proficient and managers know that admiu and manage the different affords of cities with the traditional instrument is impossible . the importance of GIS in urban planning with the speedy extension and vast decrease of information that should be processing in urban management is apparent [8].

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B. GIS definition

In the early engender of geography information system cause of the splay information and different usage in other field different definition of this system represented some of them are geography information system that for ace , maintains and use of cartographic data is delighted [11]. Geography information system is collection of powerful instrument for save and retrieval of information in future commutation and display space data in real global [3] more of GIS activity begin in 1980.in this period GIS as dynamic with speedy growth apparent and in the analyze process display palatial space data and displace (map, static data) have weight progression [1].

C. Urban and GIS

Aim of GIS urban system gain the comfortable and claw in use of urban facility and available relative and landform usage in two teaching: inner dispelling teaching with harmony with external system in environment.System's external rhyme teaching for orchestrating their roll with the inner environmental system. form the latest decade GIS have roll in urban effects works in the world . specially in French (urban planning in Lion) in urban planning locality and urbanity sportation , in Holland , in field planning usage .fire station office urban firms in take ma in USA are samples of using of the GIS in planning .choose a place for create a store , choose route for driving to gone the work station and home transportation infrastructure find solution for increase spatial problem decide to land use , locate product center and activities , choose economic an environmental solution and choose urban and regional solution is some of GIS usage [15].

D. GIS information source

Entry information to geographic to geographic information system can be divided to two parts.

A) Spatial information spatial information are the entire geometric information realty to the locality, place or point coordinate that will be distinct by geographical longitude and latitude (y,x,z).

B) Unspatial information: the spatial information are the entire information about vipigies, characterizes and trait's of exist elements in the earth , this information composed static list , exploitation : picture and film's of phenomena [17] more of than 80 percent of information in the geographical locate toward others phenomena [10]. Fig. 2-3 displey the relation this component in the entire of this system

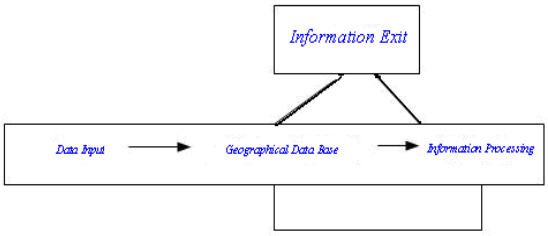


Fig. 2 displey entire component of GIS [12]

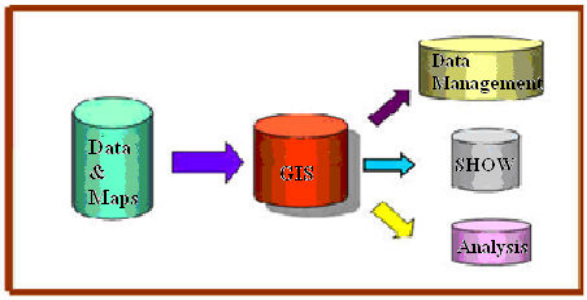


Fig. 3 the proces GIS

E. Process of the analyze information in GIS

GIS is an computer system that provide four basic ability in relation to dereference data

1- Data input 2- data management 3- process and analyze 4- output data

GIS composed of some handwave and software and users that the end of use GIS should be cleavly distirct because of this system require so much cust and fasilities for use of GIS this syatem should be capable to recive all of necessery information and so product information compeletly [9]. output and input envirous are the relational way to connect GIS with real global [2].the companies of water and sewage have two sort of information the undergrount infor mation and the information about user so this coucept that management of this mass of information with handle and tvaritioual method is very difficalt because of this necessy of a codifid system to collect information and maintain and update them is and cause of the awfull relation of the companis and units they should have database bank [5].

V. Case Study

Boukan city locate in north westeran of sanandaj(province centural kurdistan)with the 190 km of sanandaj with 46' 16" northen and 36' 15" westeran coordinate with 4 percent slop , is a muntonion region in Zagros .this involve 15/49 percent of whole area of Western Azarbaijan (Fig. 4).

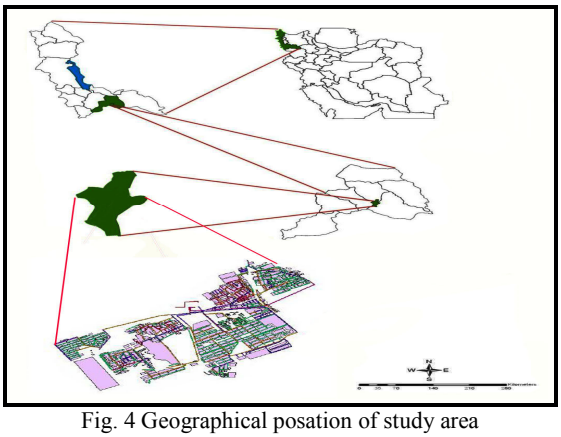


Fig. 4 Geographical posation of study area

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VI. Materials and Methods

First the maps scanned and in AutoCAD area digitizing them cause of that the AutoCAD have high precision accuracy and discretional information for make model for whole of the entered to the respective table. Provide informational required layer initional should supervised recently maps satiation and information in water and sewage and this work have been doing. the base map of city display that the exist map have not coincident with real satiation and we afford to create new maps and refer to the cartography organization in Western Azarbaijan and layer and them as a base map for water construction and sewage use them. Water construction network as DWG file was provided on old map of city. first the water construction network was loaded on 1:2000 new map and completed the shortage that was on the map information this process did in AutoCAD then the provide map coincidence with new map of city situation georefrenced. Next data collection about network detail as tables (that have identity) pomp's (that have enter) sump and tubes collected and entered the accesses software. The base of process digitizing maps is coding system. Then output map for final correction entered to the arc info 8.1 and make the topology network on it map have not ever error not need to topology for make objectionable network we use graphical environment next that transfer map to Arc view 3.3 environment and base on the exist map of primary information and map's table and base on conunicatioualy reaction make relation.For make hydrological network base on map of distribution city network sump, pumps, tubes, tabs, ties … student in their layer sewage network infrastructure with DWG file city that was provided on old base map edit on new city map with scale 1:2000. information layers preparation an descriptive information the first step to water and sewage companies for improve system ability and water distribution is product a georefrenced database .the aim of design database system is the management of awful data , data management conclude definition structure of save information and represent method for vivify information [16] after scrutiny maps and information situation of city water and sewage and product the primary instalination of water and sewage affair related GIS was done and the maps of water and sewage prepare to eater the environment.

A. Making topology

Topology is the make of palatial relation between geographical phenomena in real global in database back with use of mathematic relation's and the ordinary method is cottage spatial relation in GIS. Topology is the mathematic method for definition spatial relation one of the advantage of making topology is that the spatial analyze problem without using the coordinate some of spatial audios as neighborhood, proximity and continuity can be done just with the topology data. this character stoppage the time consuming calculates for obtain spatially relation data are save without using the topology model result this more of this operation and spatial analyze in GIS base on topology is more effective . But make topology structure cost more energy and time cause of the new map enterer change the topology should be change [4]

Though the topology have so much premium but must indicate this that in water network modeling cause of too changing in network and so specific structure network (for example in some case the tubes pass over other without ever crossover) using of topology structure is not commodious and useful further used of graphical model with snap space for join the borders (fig.5).

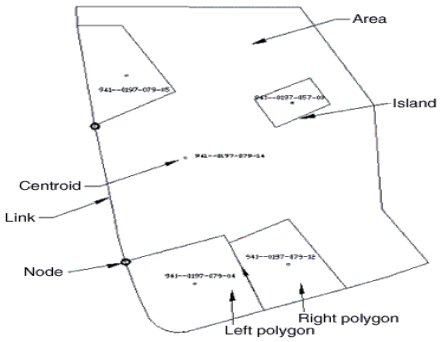


Fig. 5 topology structure

B. Network analyzing

One of importance extension of GIS software is networker analysis. This extension make the possibility analysis geographical phenomenon that have network mould (street, telephone network, water and electricity).analysis like water network analysis and distinct the nearest to the place of juncture is available by network analysis [6] (figures 6, 7 and 8).

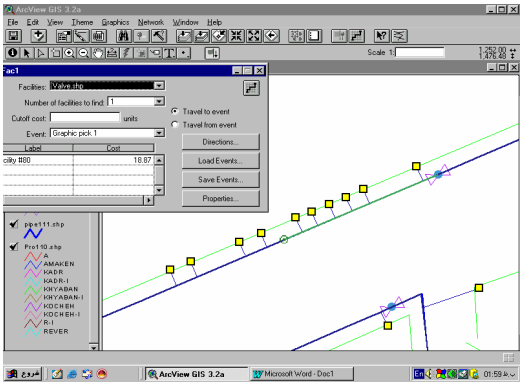


Fig. 6 nearest to the place of juncture

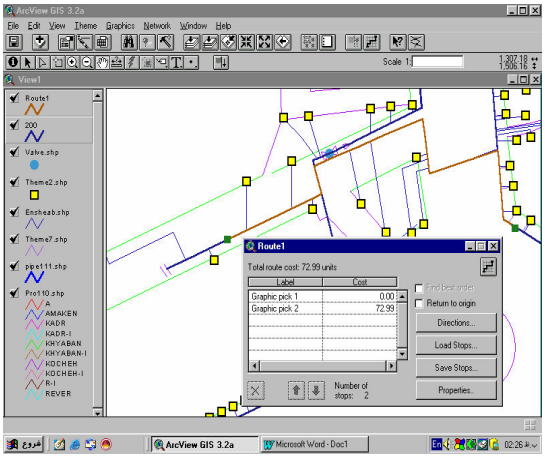


Fig. 7 shortest route between to spot from network with display distance

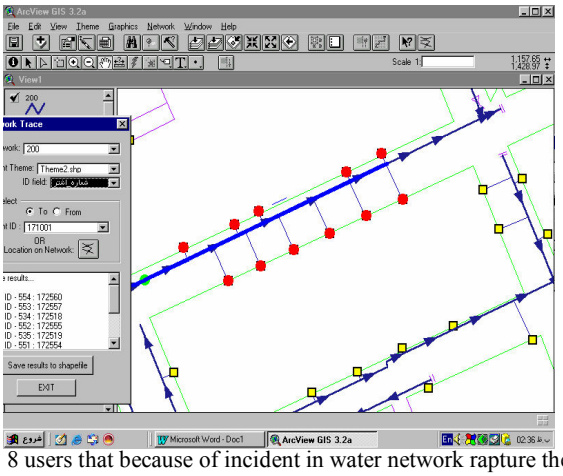


Fig. 8 users that because of incident in water network rapture their water with name and distance the incident place will be display

VII. Conclusion

Because of the high extension of networks and underground installation that composed from statistics and information and save and process them and management analysis base on our information for distinction and correct planning using GIS in the time of occur environmental incident is impossible in this article the ability of GIS investigated as a capable instrument and some of its ability that are usage in water management in the time of occur natural hazard explained. In attention to exposé complicated and urban installation in Iran using GIS in the field of urban installing is virtual.

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