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Mapping the Growth of the Artery Road by Using Gis as an Information to the Planner

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ABSTRACT

This thematic map informed the growth of the artery road in Surabaya from 1825 until 2005. The research result was the concept of equator circulation in Surabaya to anticipate the congestion in artery road.

KEY WORDS: GIS, Artery Road Optimalization, Equator Circulation.

INTRODUCTION

Surabaya City in 1825 has been managed by Dutch as his colony in East Java, after Mataram give an authority as rent land in northern East Java.
For collecting their effort in east Java Dutch has made many infrastructures like railway, road, harbour, airport for connecting to the other island and town.

The problems is how to show the growth the artery road in Surabaya by using GIS. And the objectives from the research helps the planner for controlling the road from year to year for many consideration his planning. And the research gives an information to the planner in planning and reducing congestion.

Before for research the length of artery road and secondary road is stagnan. The growth of primary artery road start in 1980 the length is 160 km straight decline , and in 1993 the length is 40 km, and in 1995 rised up until 80 km and then flat until 2008 and the growth of secondary artery road start in 1980 the length is 163 km straight decline , and in 1993 the length is 40 km,
and in 1995 rised up untul 77 km and then until then flat until 2008[4]. From Road Mapping in Surabaya 1825 until 2005 and Landuse Plan and Artery Road in Surabaya Regency-2005[3] shown that ther artery must be chaned. By using GIS it can be performed about Equator Circulation as an innovation artery road for the future. But there is a step in reaching to objectices where there are a land near the congestion, it can be developed as frontage road or enlargement of road.

A GIS is a computer system capable of capturing, storing, analyzing, and displaying geographically referenced information; that is, data identified according to location, Practitioners also define a GIS as including the procedures, operating personnel, and spatial data. Geographical information system can be used for investigation of science, source of management, and development planning. For example GIS very suitable for planners in emergency situation so easily to count time emergency, responsibility in event from disaster or GIS maybe used for finding wet land that needed protection and pollution. Data from raster map, it can be created by using CAD progam and changed to show the map in vector.[2]

METHODS

Method that be used is : field survey as a ground thruth about the map and the road situation.
Discussion between researcher and some of profesional and promotor or forum discussion group.
Equpiment that be used consits of:
Hardware : laptop Sony Intel, memeory 1024 Mb, harddisk 120 GB
Softwre : Arc.GIS 9.2 and 9.3; Auto Cad 2007

RESULTS AND DISCUSSION

Surabaya city lies on South Latitude between 7°9' - 7°21', and 112°36' - 112°57' East Latitude. The large of territory Surabaya city : 326,37 km², the boundary of administrative territory limited by North : Madura Strait, Bangkalan Regency; East : Madura Strait; South : Sidoarjo Regency; West : Gresik Regency. Some figures of the town can be shown as datum as follows: Temporal maps since 1825 s.d. 2005 will be explained as follows:[3]

Maps 1825 until 1905(Dutch Government)

The length of the artery road in 1825 from Perak to South until Keputran and then grown until Wonokromo or Zoological Garden. In 1867 Dutch Goverment constructed Fort of the Prins Hendrik, and in 1879 they constructed railway and Surabaya Kota Station, Gubeng and to be continued Wonokromo Station.

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This transportation as an alternative of mass transportation in 1891 and so it is there are Kali Mas Station at Perak near the harbour that constructed in 1867-1905 for bringing the agriculture's commodity from East Java to Europe.

1940 - 1949:

The road added until Zoological Garden as a visual can be seen the development of the city in north area in 1940, has been constructed naval air station Morokrembangan, but in 1949 they built stadion in the west Surabaya. This map has been prepared in

1988 – 2000:

Surabaya map in 1988-1989, the growth of a city from north has spread to south and that is starting point of the development from center to the west.

In this periode Surabaya created a Master Plan 2000. In 2001 its happened a change of the Surabaya's border, because the wide of land in the beach. The result of raster map to be digited and produced the network of artery road and the growth. A process research from Surabaya Metropolitan Area can be found as chronology of the map that give an information about the changes of the road. In the year 2000 has been prepared A Master plan map.

JICA[1], Urban Development Of Planning Study On Gerbangkertasusila Region(Surabaya Metropolitan Area), Final Report Executive Summary. has shown about the development of the road is making a new road in east and west side from the artery road between A. Yani until Perak).

All of the map above in raster that be changed in vector , the proces as follows

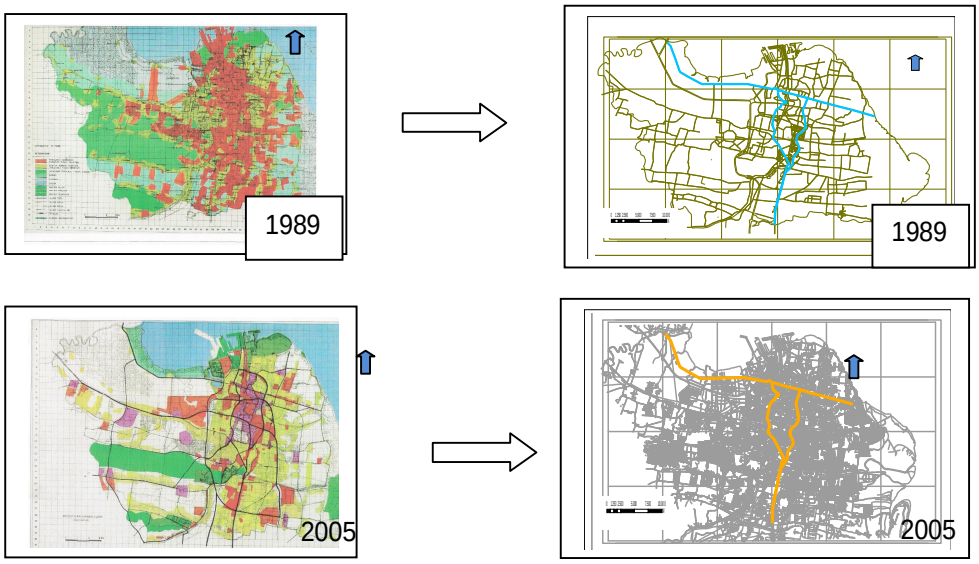

Figure 1. Process some of the maps that be chenged from raster to vector : 1949, 1989, 2005.

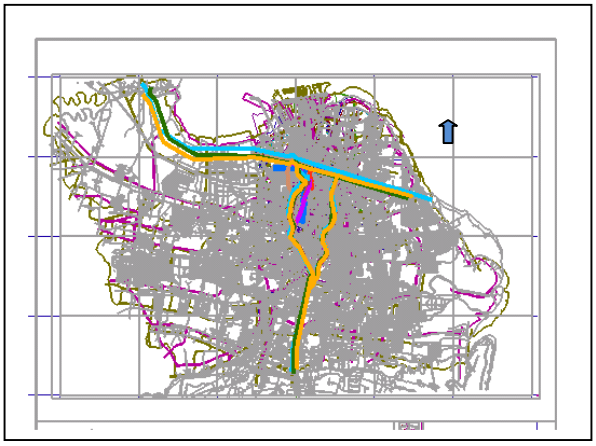

Figure 2. Super imposed all of the raster map from 1825 until 2005

Temporal Map Application in Arc.GIS.

According to the research of the optimalization artery road by using Arc. GIS for making controlling the growth of artery road from 1825 until 2005, with a result as follows: (see Figure 1 and 2) Digital map result from raster map has been produced and gives the growth of information or artery road which nominated direction from north to south. It can be informed that event happens since 1825.

Result analysis

Artery road optimalization used to spatial planning.

The last effort is analyzing all of the figures by connecting relation between the direction from east and west as a globe belows. So it is called equator circulation :

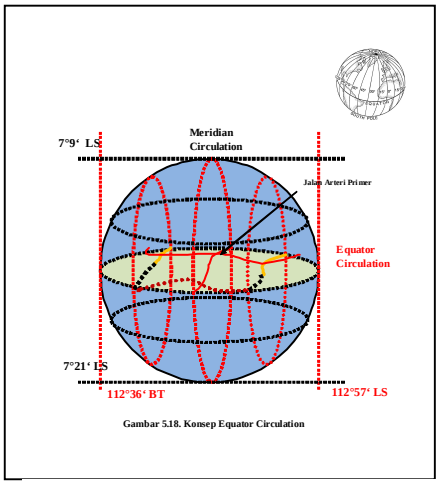

Figure 3.Equator circulation model

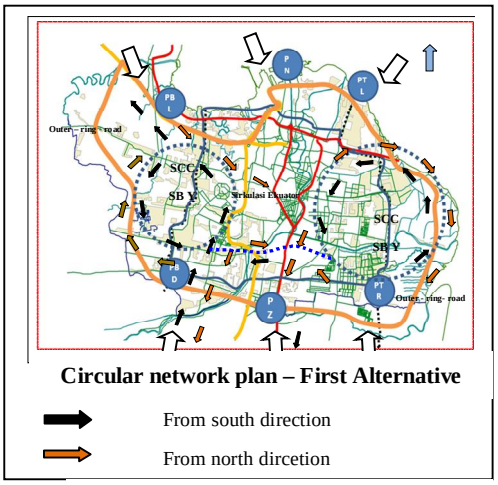

Figure 4. Surabaya West Sub City Center and Surabaya East Sub City Center Model.

The first model equator circulation is supported by two spatial sub city center in the west and the east. The two spatial must be connected with a new artery that lifted or underground in helping reducing congestion in north and south direction.

See figure 3,4.

Exactly the second model is Grid model. That followed by spatial detail as in Figure 5. as a process until optimalization the join of the artery road that consists of primary and secondary artery.

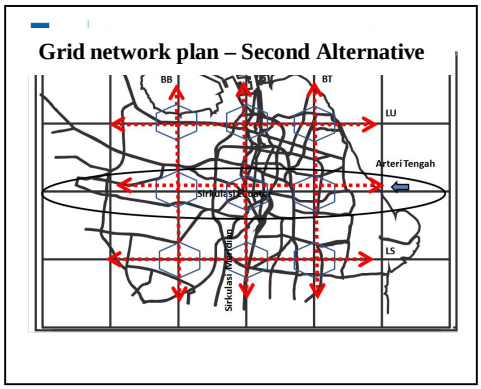

Figure 5. Grid Model of he Region

Conclussion

A global conclussion can be delivered that:

a. The growth and development or primary artery road in periode 1825 – 2005 it can be shown by using GIS . The result if this analysis make easier and help the planner to interpretation in network mapping of the artery road in the next year.

b. Beside the plan froam Urban and Regional Planning of Surabaya City and JICA , the result of this research is to innovate an Equator Ciculation as problem solving the direction form east to west. According to optimalization has been appeared the two alternatives that is called
Scenario I : Circulation model
Scenario II : Grid Model
But the two model always use the **Equator Circulation** to optimalization the artery road.

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