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HIGHWAY DESIGN AND TRAFFIC CONTROL

After World War II, the United States of America made a major commitment to construct freeways that would connect all of the major cities within the nation. This National Defense and Interstate System was design to facilitate the movement of military forces and equipment for the defense of the nation. This highway system has had a major impact in promoting America's economy. The vast majority of the nation's commerce is transported via the nation's highway system. However these highways have had a detrimental impact upon the city-center of the nation's largest cities by promoting the development of growth at the fringes of urban areas. In urban areas the nation's freeways have traffic volumes that far exceed their capacity. It is suggested that the future development of an integrated national highway system will be in three directions: geometric balance, control of traffic flow, and intelligent highways. Research and development is needed in all three areas. For those nations planning on developing a new highway system, they should avoid repeating past mistakes of using designs that have not change since the post war 1940's.

Urban arterials (freeways and expressways) need to promote more than mobility. Access to abutting property is critical to prevent the slow but steady decay of the center of the city. It is believed that there are geometric designs that have capacities approaching that of a limited access freeway but at a fraction of the cost of construction. These designs also provide excellent access to abutting property and promote a healthy business climate. The separation of commercial vehicles from private vehicles is also an option to be researched. The design of urban arterials should be compatible with the subsequent implementation of traffic-control hardware and/or intelligent guidance systems.

The control of traffic is often less effective than optimal because most control strategies control traffic entering the arterial and do not control the major main line flows. Often control strategies promote longer trips at the expense of the shorter trips. Thus the control strategies may produce a benefit in the short term but in the long term actually lead to traffic volumes increasing. The traffic volumes increase not necessarily because of the number of trips have increased but from the trip lengths becoming much longer. It is important to research and understand the long term impacts of freeway control strategies. It is more important to gain an understanding of how to prevent traffic flow in the bottlenecks in the system from collapsing and creating grid lock.

Eventually it will be necessary to increase capacity of our urban freeways and expressways by overcoming the physical limitations of the driver. Research efforts to develop and retrofit American freeways to allow the highway to drive

the car are just beginning. Michigan State University is expected to be actively involved in these research efforts in collaboration with the Michigan Department of Transportation and Michigan based auto industries.