1. INTRODUCTION

1.1 INTRODUCTION TO SUSTAINABLE DEVELOPMENTS

“Meets the needs of the present without compromising the ability of future generations to meet their own needs” – (WCED 1987)

(Brundtland Commission’s Report)

There is growing interest in the concept of sustainability, liveability, sustainable development and sustainable transportation. Sustainability generally refers to a balance of economic, social and environmental goals, including those that involve long term, indirect and non-market impacts, liveability refer to the subset of sustainability goals that directly affects community members. As transportation have immense economic, social, and environmental effects its plays a significant role in maintaining sustainable development.

“Sustainability is not about threat analysis, Sustainability is about system analysis, specifically, it is about how environmental, economic and social system interact to their mutual advantage or disadvantage at various space- based scale of operations”

(Transport Research Board 1997)

Thus a sustainable transport system is one that is accessible, safe, environmentally-friendly and affordable.
1.2 DEFINITION OF SUSTAINABLE TRANSPORTATION

A sustainable transportation system is one that (centre for sustainable transportation, CST, 2005)

- Allows the basic access needs of individuals and societies to be met safely and in a manner consistent with human and ecosystem health and with equity within and between generations.

- Is affordable, operates efficiently, offers choice of transportation mode and support a vibrant economy.

- Limits emission and waste within the planet’s ability to absorb them, minimize consumption of non-renewable resources, limits consumption of renewable resources to the sustainable yield level, reuses and recycle its components and minimizes the use of land and the production of noise.

Good land use planning requiring minimum need to travel, transportation network friendly for all classes of people, transportation modes causing minimum amount of air pollution and transportation options demanding least cost and effort of people can be considered as various aspects of a sustainable transportation system. It includes the application of system, policies and technologies which would help achieve the continuous economic development without having a detrimental effect on environmental and human resources. Sustainable transportation aims at the efficiency of the transit of goods, services and delivery systems with minimum accessibility problems.
1.3 SUSTAINABLE TRANSPORTATION SYSTEM

Sustainable transportation system aim at designing of congestion-free urban planning with bicycle and pedestrian friendly design of their areas. It focuses not only on the vehicles but also on moving people, which in turn would reduce air pollution as well as the increasing congestion. Sustainability can be achieved with the change in behavioural aspects of people. When people understand the impact of transportation they can in turn make choices that reduces the need for resources and thus minimize the adverse impacts.

![Sustainability Curve](image)

Sources:- Sustainability Transportation conceptualization and performance measure, Texas transportation Institute.

**Figure 1.1: Sustainability Curve**

Socio-economic needs of the people increase with growth in technology. Figure 1.1 shows the increasing needs of and depleting resources. After a certain point of time, the resources are unable to satisfy the needs and the unsustainable conditions arise. Thus the imbalance is created as the supply gets diminished as compared to demands.
1.4 NEED FOR SUSTAINABLE TRANSPORTATION

Urban transportation facilities or the processes of achieving mobility in a urban setting are a part of the urban habitat. The question is what does this habitat includes other than the roads, intersections, bus-stops, rail lines and so on? The urban habitat includes the people belongs to the different classes such as rich, middle and poor. The work places, the services (like the hospital, the fire services etc), the residential areas, the recreational facilities, educational institutions, commercial establishments have been organised in the urban habitat. The way this habitat is organised creates the transportation demand and supply pattern.

A definite mandate of any transportation system should be to allow the uses of the system to efficiently harvest the opportunities. What types of demand pattern are created and how they are met (supply pattern) through the use of the resources have a large bearing on whether the transportation system is sustainable. (i.e) whether the transport system will remain efficient for over a period of time and space (i.e) the system must be efficient not only to a restricted area but also regionally.

Efficiency has been a driving force in engineering design. If a system is seen to be inefficient, then effort is expanded to improve the efficiency. If the problem arises in the way then efficiency is often measured. A couple of example on how a tradition view of efficiency can lead to non-sustainable developments whereas a more inclusive definition of efficiency could have led to sustainable development will highlights this issue better.

Few decades ago, it was felt that good roads should be provided to achieve fast and safe transportation of people and goods, the efficiency of the road system would be measured according to how well it met the stated goals. Hence, when roads become congested one built even more roads, roads
without- at grade intersections, limited access roads and so on. Two lane roads become four lane highways, four lane highways become six – lane expressways and this would have continued but for the realization that there is no end to it. If on the other hand, the definition of efficiency was more inclusive and had features like.

(i) The amount of exhaust that would create if more people drove.

(ii) The amount of fossil fuel that will be consumed etc, then obviously which encouraged more automobile traffic would no longer be thought of as efficient.

Planners and Engineers would have had to look for other solutions.

Thus three aspects are important to the creations of a sustainable urban transportation system.

(i) The habitat of which the transportation system is a part

(ii) The resources that such a system will need to harvest.

(iii) The measure of efficiency that should be employed to evaluate such a system.

1.5 CONCLUSION

A sustainable condition for this planet is one in which there is stability for both social and physical systems, achieved through meeting the needs of the present without compromising the ability of future generations to meet their own needs. Thus a sustainable transport system is one that is accessible, safe, environmentally-friendly and affordable is required to make the roads more efficient.