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## ANALYSING THE RAILWAY SLEEPERS USING WASTE MATERIAL

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**ABSTRACT :** *Railway sleepers are one of the most important elements of the railway track system. Although timber sleepers are still the most common, use of pre-stressed concrete and steel materials is also increasing. In addition, ties produced using recycled materials are of interest, recently. By recycling plastic waste, considerable amount of money can be kept from ending up in the landfills. Composite sleeper has become a great replacement of traditional sleepers (Timber, concrete, steel). There are also now various environmental concerns regarding the use and disposal of chemically-impregnated traditional sleepers. They are superior to timber & concrete sleeper in almost every respect. Use of composite sleepers not only reduces the land pollution from stray waste plastics but also ensure less destruction to the forests. As composite ties are strong, durable, and reliable, they require less maintenance and have longer life than common railroad ties. Therefore, they can be an excellent, cost-effective and long-term solution. If we use a pre-stressed concrete sleepers or steel sleepers then then initial setup cost as well as maintenance cost will be high. So, it is necessary to introduce such a sleeper which is economical and eco-friendly.*

**KEYWORDS – STEPS TOWARDS GREENER TOMMOROW.**

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## I.INTRODUCTION

Railway sleepers are the main structural elements of railway track. As well as pressure distribution and load transfer to the underlying layers, railway sleepers are in duty to maintain track gauge, grantee lateral stability of the track and contribute in better geometrical conditions of the track. Vertical, lateral and axial

forces are applied to rail sleepers. Traditionally, sleepers (known as ties) are wooden. They can be softwood or hardwood. Sleepers are normally impregnated with preservative and, under good conditions, will last up to 25 years. They are easy to cut and drill and used to be cheap and plentiful.

Nowadays, they are becoming more expensive and other types of materials have appeared, notably concrete and steel. Steel sleepers have been around for a long time. Their use is traditionally associated with light axle load lines in tropical zone, where timber sleepers may be subject to attack by termites.

Rail track is currently installing around 6 lakh sleepers annually on its network, which totals 32,000 track- km. Concrete is the most popular of the new types. Concrete sleepers are much heavier than wooden ones, so they resist movement better. They work well under most conditions but there are some railways which have found that they do not perform well under the loads of heavy haul freight trains.

They offer less flexibility and are alleged to crack more easily under heavy loads with stiff ballast.

Recently, composite sleepers have come in the market. They are made of old tires and recycled plastic. They can be used and spiked like regular ties, cost about 50% less and save on trees. We should encourage the use of plastic in our country and rest of the world. Do not be puzzled, it is essential in the production of recycled plastic sleepers and other tools used for laying tracks by railway sector. Plastic used in our everyday life can be used to manufacture composite plastic sleeper provided we dispose the plastic in recycling bins rather than on lands or water bodies. Recycling plastics for manufacturing sleepers for railways is an effective way in overcoming the environmental issues related to plastics. Plastics sleepers are more durable and efficient when compared to the traditionally used sleepers made from wood and concrete.

Plastics waste scenario in the world, of the various waste materials, plastics and municipal solid waste are great concern. A material that contains one or more organic polymers of large molecular weight, solid in its finished state and at some state while manufacturing or processing into finished articles, can be shaped by its flow, is called as 'Plastic'. Finding proper use for the disposed plastics waste is the need of the hour. Plastics, are versatile packing materials and commonly used by man but they become problem to the environment INDIA, the consumption of Plastics will grow 15 million tons by 2015(Mumbai generates 7,500 metric tons of waste everyday, of which nearly 9% is plastic waste) and is set to be the third largest consumer of plastics in the world. Around 55% is being used for packing. They are mostly dropped and left to litter the environment, after the contents have been consumed. The littered plastics, a non-biodegradable material, get mixed with domestic waste and make the disposal of municipal solid waste difficult. The municipal solid waste is either incinerated or land filled. Both disposal methods are not the best ways to dispose the waste and it causes both land and air pollution. Moreover, if municipal solid waste contains PVC waste, when burnt, it produces toxic gases like dioxins. Disposal of plastic wastes in an eco-friendly way is the main thrust area of

today's research works. So that we introduce an idea to make a railway sleeper using waste materials.

## II. METHODOLOGY

- **LS-DYNA is a stimulation software which is developed by ANSYS. LS-DYNA is a general-purpose finite element program capable of simulating complex real world problems. It is used by the automobile, aerospace, construction, military, manufacturing, and bioengineering industries Large deformations (for example the crumpling of sheet metal parts LS-DYNA's potential applications are numerous and can be tailored to many fields. In a given simulation, any of LS-DYNA's many features can be combined to model a wide range of physical events.**
- **Capabilities: Linear statics, Thermal analysis, Failure analysis,**
- **Material Library:**
  - **Metals**
  - **Plastics**
  - **Glass**
  - **Foams**
  - **Fabrics**
  - **Elastomers**
  - **Honeycombs**
  - **Concrete & soils**
  - **Viscous fluids**
  - **User-defined materials**

## III. CONCLUSION

Primary goal of the project is to put forth the use of railway sleepers made from waste plastic and waste rubber in order to having introduced totally new and very effective type of railway sleepers. • The prototype of sleeper casted using waste plastic (of various types) and waste rubber proved to be safe and efficiently workable for the Indian Railways. As far as strength of composite sleeper is concerned, it is three times stronger than already used concrete sleepers by the Indian Railway. 44 • This composite sleeper proves to be efficient in the skidding portion, where turns are present at the gradient of the railway tracks. • The totally recyclable property of this composite sleepers makes it highly usable also, the life span of the sleeper is very much extensive compared to the other various types of sleepers so, this composite sleeper is very effective in manner of performance,

durability and life span. • Also, it helps in overcoming one of the biggest present-day environmental hazards caused. Due to the over increasing amount of waste plastic causing environmental and health hazards. Thus, by putting these polluting elements the fruitful use of casting these sleepers, the concept of “Greener Earth” can be achieved.

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