

## MATERIALS FOR FOOTOVER BRIDGES

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**Abstract** – *The concept of using materials in FOOTOVER BRIDGES to improve strength and durability. During the last 30 years different types of materials were introduced and are being continuously introduced in the market as new applications. These types of materials can be made of metals, natural, glass or organic materials.*

*In the past three decades, extensive research on different types of materials has shown that materials can be added to Footover bridges to improve its durability and physical properties such as cracking induced by plastic shrinkage, drying shrinkage and thermal gradient on the surface of fresh and mature concrete due to the severe environmental conditions has been marked as one of the several causal factors of deterioration of reinforced concrete in the country.*

*It was found that the use of MATERIALS considerably increases the Strength. The compressive strength has increasing by 10% with of fiber than start decrease with increase the fiber quantities.*

*Compared to corresponding plain concrete, there was a favorable decrease in drying shrinkage and creep of specimens containing various materials contents.*

**Key Words:** Footover bridges, STAADPro, Materials, Steel, Cable, Costing, Economical.

### 1.INTRODUCTION :

A footbridge also called a pedestrian bridge, pedestrian overpass, or pedestrian overcrossing is a bridge designed for pedestrians and in some cases cyclists, animal traffic, and horse riders, instead of vehicular traffic. Footbridges complement the landscape and can be used decoratively to visually link two distinct areas or to signal a transaction. In many developed countries, footbridges are both functional and can be beautiful works of art and sculpture. For poor rural communities in the developing world, a footbridge may

be a community's only access to medical clinics, schools and markets, which would otherwise be unreachable when rivers are too high to cross. Simple suspension bridge designs have been developed to be sustainable and easily constructible in such rural areas using only local materials and labour. Small footbridges can also be used for a technical effect in ornamental gardens. Types footbridges include: Simple suspension bridge, Clapper bridge, Moon bridge, Step-stone bridge, Zig-zag bridge, Plank, Boardwalk, Joisted, Simple truss. Different types of design footbridges include: Timber footbridges, Steel footbridges, Concrete footbridge.

**1.1 Advantages:**1.Provides safe and sustainable crossings and provides technical assistance to local government and communities need simple, easily applied guidelines on the selection and construction of effective water crossings. 2.Much rural travel takes place on local paths, tracks and village roads. These provide essential access to water, firewood, farm plots and the classified road network.3.Communities and/or local government are generally responsible for this infrastructure.

**1.2 Disadvantages:** Pedestrian overpasses over highways or railroads are expensive, especially when elevators or long ramps for wheelchair users are required. Without elevators or ramps, people with mobility handicaps will not be able to use the structure. Often, people will prefer to walk across a busy road at grade rather than expend the effort to climb up the bridge and go over it.

### 2. Methodology :

STAADpro features state of the art user interface, visualisation tools, powerful analysis and design engines with advanced finite element (FEM) and dynamic analysis capabilities. From model generation, analysis and design to visualisation and result verification STAAD pro is the professional first choice. STAAD pro was developed by practicing engineers around the globe. It has evolved over 20 years and meets the requirements of ISO 9001 certification. STAAD or (STAAD.Pro) is a structural analysis and design

computer program originally developed by Research Engineers International at Yorba Linda, CA in year 1997. In late 2005, Research Engineers International was bought. An older version called STAAD-III for windows is used by Iowa State University for educational purposes for civil and structural engineers. Initially it was used for DOS-Window system. The commercial version STAAD Pro is one of the most widely used structural analysis and design software. It supports several steel, concrete and timber design codes.

### 3. Materials used for Footover bridges

#### 1. Steel Footover bridges-

Steel can be more effectively protected using simple hand methods of brushing or spraying and therefore steel bridges are likely to have a longer life and lower maintenance costs than timber bridges. Steel truss bridges are more straightforward to fabricate than timber truss bridges and are likely to be more appropriate for spans of intermediate length.



Fig 1-Design of steel footover bridge using STAAD pro

Costing for steel footover bridge-

Table -1:

Costing Analysis			
Sr No	Particulars	Quantities (kg)	Cost (Rs)
1	Roof	2225.020	89,000.83
2	Truss	6069.96	4,61,316
3	Slab	8229.5	3,00,392
4	Staircase	45359.8	50,55,312

Steel footover bridge- Total cost is 27,68,150/-

Annual 5% contingency on total cost i.e. 1,38,407.50/-

Total cost of Steel footover bridge is 29,06,557.79/-

#### 1. Cable Footover bridges-

The introduction of computer aided design, along with the development of new materials, has greatly assisted the design of cable stayed bridges. They now cover a wide range of spans from 100 to 1100 meter. This form of bridge type has proved to be very attractive for light pedestrian bridges with unusual loading configurations and is also suitable for heavilyloaded highways. Concrete and steel are used either separately or as composites in the construction and it is possible to have multiple cable stayed bridges joined together e.g. Lake Maracaibo, Venezuela (1961) and Millau, France (2004).The main applications of cable type footbridges, suspension and suspended, are for spans over 20 to 25m where intermediate pier supports are impractical. In these situations they may be the only option, particularly where a ferry is not feasible. They are a cost-effective solution for light to moderate traffic of pedestrians, pack animals and livestock, for medium to long spans.

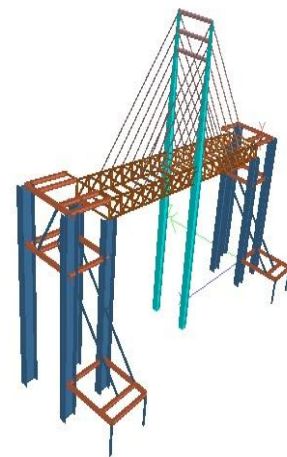


Fig 2- Design of Cable footover bridge using STAAD pro

Costing for Cable foot over bridge-

Total weight of the cable footover bridge is 39977.87 Kg

Cost of the cable footover bridge is 12,39,113.1941/-

Annual 5% contingency on total cost i.e. 61,955.65/-

Total cost of cable footover bridge is 13,01,068.84/-

#### 4. CONCLUSIONS

Using STAAD-Pro software, the design consideration has been taken as per the IS codes. The design is safe in all conditions.

On the comparison with drawing, design and geometrical model using STAAD-Pro the design of slab, beam, column, rectangular footing are done, which is safe at control of deflection and in all aspects.

Thus referring to the case studies we can construct more durable Foot over bridge in less cost.

Thus comparing the two bridges using STAADpro we conclude that cable footover bridges are more durable and economic.

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#### 6. BIOGRAPHIES



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