

The Enshi funicular

Charles Cayatte, Arnaud Lemaire

SYSTRA, Paris, France

Contact: cacayatte@systra.com

Abstract

Enshi Grand Canyon is one of China's remarkable sites. A one-kilometre-long funicular, carried by steel viaducts on half of the line and a slab track on the other half, will soon be inaugurated to transport visitors with a nearly carbon-free transportation system. These metal structures have unique designs, dictated by the strong constraints of the funicular system and the constraints of accessibility, constructability and transport on this mountainous site. This article presents the main characteristics of these works.

Keywords: Steel bridges; funicular; constructability; site constraints; innovative structures.

1 Introduction

The Enshi funicular will take visitors from the Tourism Center, where hotels, parking and ticket offices are located, to the bottom station of a gondola system for easy access to the many hiking trails in the immediate vicinity of the stations. Visitors will be able to access the top of the cliffs and discover the must-see spots of the "incense stick" and the "castle", unique limestone rock formations 500 m high.

The Enshi funicular is a technology which not only adapts perfectly to the topographical configuration of the Grand Canyon of Enshi but which also represents a relevant choice of mobility, responding to the twin challenges of performance and respect of the environment. The journey will now be direct, fast and nearly carbon-free. This funicular will help to preserve this magnificent, busy site, thanks to an ecological alternative to the continuous circulation of buses which currently pollute and congest the few roads of this natural site.

2 The funicular technology

A funicular is a mechanical lift generally equipped with two trainsets of vehicles, running on sloping rails, and towed by a cable. As the weight of the descending train compensates for all or part of the weight of the ascending train, the energy to be supplied by the traction thus remains relatively low.

The engine driving the cable is in the top station of the line. It provides the power lost by the friction of the wheels on the rails, of the cable on pulleys, as well as what is necessary to overcome the difference in weight between the two trains (Figure 1).