Development of new stay cable dampers

Development of New Stay Cable Dampers

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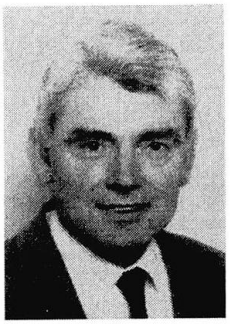

Abstract

Presentation of the different steps of analysis and the results of this analysis : the development of new stay-cable-anchorage dampers, and particularly the new damping system that will be installed on the stay cables of UDDEVALLA Bridge.

1 Review of the different damping systems used on bridges

Cable vibration on cable stayed bridges is known since several years, but it is only recently that this problem is becoming more and more critical, perhaps due to the increasing span lengths of the bridges and the reducing of the dead load of the decks.
Engineers developed some damping devices and we will review the different systems with a particular point on the three following items :

- Installation of a damping system on an existing bridge
- The fatigue of the damping systems
- Cost of the maintenance

2 Definition of the criteria and specifications of a damping system

We will dress the list of criteria and specifications that will have to be considered by the designer of a damping system.
Some damping systems are composed of mechanical or hydraulic components. These components are generally submitted to small movements and small loads, but with a high level of frequencies and can thus have a total displacement of several tens of kilometers per year. So according to the present experience, the fatigue criteria will perhaps be the most important criteria.

We have also to consider the maintenance cost that could be several times the initial cost of the damping system within a very short period compared to the duration life of the stay cable. The beauty, architecture and the highness of the cable-stayed bridges are very important

parameters. So the aesthetic is today one of the most important specification imposed by the client to the designer of a damping system.

3 A new development : the friction damper

The paper will present the development of a new friction damper, designed by D. KOVACS and developed in collaboration with VSL for a future installation on the UDDEVALLA Bridge. One year ago, a new friction damper has been tested to reduce the critical vibrations observed on some stay-cables. According to this first experience, a new generation of friction dampers will be installed on UDDEVALLA Bridge.

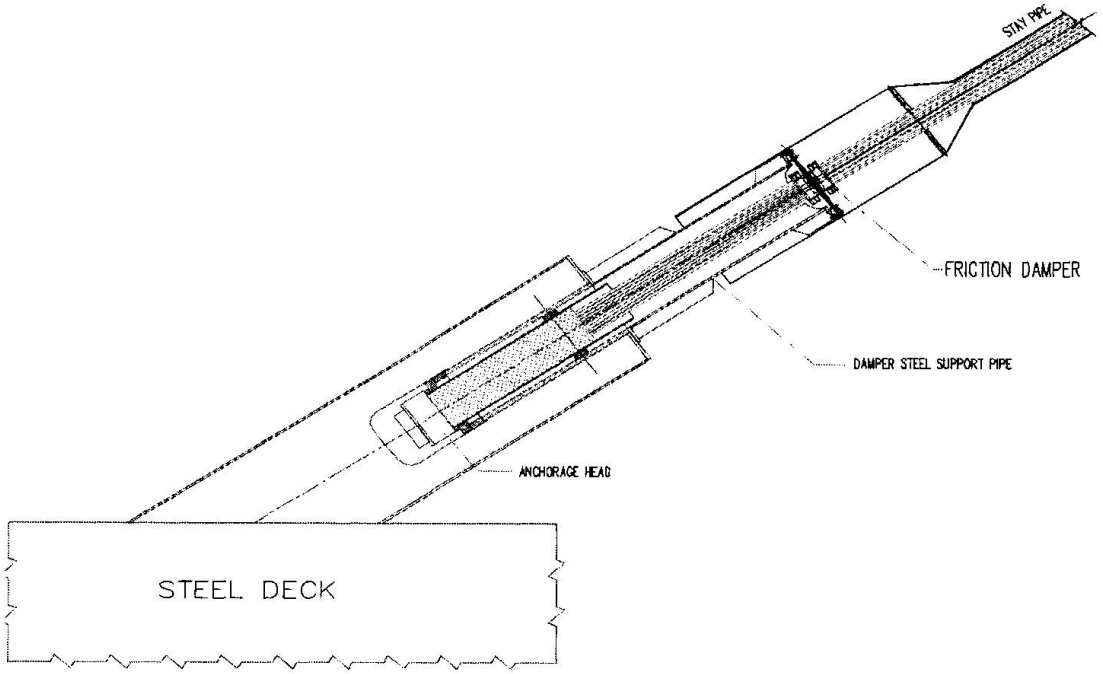

Figure 1. Installation of friction damper on UDDEVALLA Bridge

4 Conclusions

Researchers have to work, to have a better understanding of cable vibrations. Dampers characteristics have to be optimized. For the future, designers are working on a new generation of damper : the active control damping system.