



Technical Research on OVM250 PSC System with High Fatigue Strength and Full Life Cycle Durability

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Abstract

With the development of modern long-span cable-stayed bridges, due to the Parallel strand cable (PSC) being assembled on-site strand by strand, which has the advantages such as no need for large-scale equipment for cable-making, delivery, hoisting, traction, tensioning, and the corrosion protection of the cable is excellent, it is more and more favored by designers.

As the load-bearing components, the stay cables are known as the life cable of the cable-stayed bridge. Its reliability and durability are the key factors that determine the safety and the service life of the cable-stayed bridge. In accordance with the requirements specified in international recommendations, in-depth research has been carried out on cable fatigue, anti-corrosion, vibration control to optimize OVM250 PSC system. All research results have been successfully applied to cable stayed bridge projects.

Keywords: high fatigue strength; corrosion protection; UV resistance; vibration control.

1 Introduction

Continuous development and breakthroughs of anti-corrosion technology of the stay cable system have provided favorable conditions for the development of modern long-span and super-long-span cable-stayed bridges. And the increasing demand for cable-stayed bridge construction has promoted the development of stay cable technology and ushered in a new technological innovation in the stay cable system. In order to ensure the safety and durability of long-span cable-stayed bridges, higher requirements are put forward to the reliability, durability, construction convenience, cable force monitoring and even fire & explosion protection of the stay cables. In recent years, the PSC technology is favored and has been applied in more and more super-long-span cable-

stayed bridges all over the world (e.g. Russky Bridge in Russia with main span 1104m) for its multi-layer redundant anti-corrosion, strand-by-strand installation and stressing method, the lightweight erection equipment, and the convenience of maintenance and individual strand replacement.

In 1993, a survey on bridge stay cable systems was carried out, for the question “what are the three most important aspects/requirements for a stay cable^[1]”, durability and fatigue received a relatively close percentage rating 28.3% and 26.6%, respectively, they are much higher than other aspects.

In international recommendations of Setra CIP^[2], fib bulletin 30^[3] and PTI^[4], fatigue and subsequent static tests are specified. In these three(3) recommendations for stay cable system, the