

Monitoring The 352 Meter Long Monaco Floating Pier

Marcel de Wit
Business Development Manager
Advitam
Vélizy, France
marcel.dewit@advitam-group.com

Gilles Hovhanessian
General Manager
Advitam
Vélizy, France
ghovhanessian@advitam-group.com

Summary

Again limits have been pushed further with the realization of the key element of the extension of the Condamine port at Monaco, a 352 m long and 163 000 tons semi-floating pier.

The highly pre-stressed reinforcement concrete structure with a design life of 100 years is attached to the main land abutment with a very complex and 770 tons steel ball-joint system while the other end of the pier it is secured with two sets of fixed anchor chains to the seabed.

This exceptional project is a mix of building techniques, mechanical engineering, and offshore works: it includes several world records and, particularly, the spectacular connection of the ball joint system.

All these design breaking records are possible thanks to the evolutions in civil design & construction methods. In this context another evolution is of great help to allow confirming that the structures are behaving like expected by the calculation models: the monitoring tools. New technologies for the monitoring of structures are powerful tools to better understand the behaviour and make sure that structure remains in good health over time.

In this paper we will review the structural health monitoring system that is installed for this extraordinary structure.

Keywords: Structural Health Monitoring; Instrumentation; Structures; Management; Maintenance.

1. Introduction

The first goal of a monitoring system is to provide a confident, accurate and time related measurement of specified parameters. The monitoring system installed on the floating pier has several goals :

- Asses and follow carefully the behaviour of the structure and its key structural equipments as the steel ball joint
- Establish health rules representatives of structural behaviour in various situations (high loads, bad weather or sea conditions, earthquake...)
- Monitor ageing effects over the years
- Compare real behaviour of the structure with expected behaviour coming from the theoretical models.

Provide real time alerts to security services or traffic control service in case usage restriction is required because of particular situation.

The particularities of the floating pier are that it is subjected to several very different load cases, impacting various part of the structure. Then the parameters to monitor are widespread and very variable. As a consequence, the monitoring system installed on the floating pier is diversified in