



Chernobyl New Safe Confinement project – Steel arch permanent bearing

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Abstract

The New Safe Confinement (NSC) is a design and build project, first of its kind in the nuclear field engineering. Never before such an important structure has been constructed in severe and difficult site conditions with high risk of radiation. The NSC is a steel arch, under construction by NOVARKA (JV Vinci Construction and Bouygues Construction), destined to contain the remains of the No. 4 unit at the Chernobyl Nuclear Power Plant near Pripyat, Ukraine, which was destroyed during the Chernobyl nuclear accident in 1986. The steel arch is linked to a concrete foundation with 31 spherical bearings (TETRON SB®) designed and supplied by Freyssinet. These bearing have been designed under the European Standard, however, the Ukrainian Standard has also been covered.

This paper describes the design, fabrication and tests of the spherical bearings, focusing on the main aspects related to the exceptional service environment (such as radiation and temperature), the impact on the constitutive materials and the bearing capacity.

Keywords: spherical bearing, nuclear, Chernobyl, arch.

1 Introduction

The 26th of April 1986, the N°4 reactor unit at the Chernobyl Nuclear Plant exploded. Quickly, in order to contain the radioactivity, the remains of the reactor building were enclosed in a large concrete cover which was named the “Object Shelter” or sarcophagus. The 30 year lifespan of the sarcophagus led the Ukrainian authorities to cover in November 2016 the existing shelter by a New Safe Confinement.

2 New Safe Confinement

The confinement, in the form of an arch, is composed of a 25,000 tons metal frame.

Exceptional in size, the arch measures 108 meters high, 162 meters long for a range of 257 meters.

This new arch is able to cover the Stade de France, or the statue of Liberty, or the floor space of the Eiffel Tower (Fig.1).

These dimensions make the arch the largest mobile metal infrastructure in the world.

Engineering and construction of the arch have been performed by the consortium NOVARKA that consists of two French companies: VINCI Construction Grands Projets and BOUYGUES Travaux Publics.