



Reference order from the Grande Nation:

Flamanville

PARIS

SNT service team installs cooling structure of the core catcher in Flamanville

France remains loyal to us: After the successful completion of the supply contract "Core catcher for the EPR™ new reactor construction Flamanville 3 (FA3)" of the AREVA industrial group, Siempelkamp Nukleartechnik (Siempelkamp Nuclear Technology = SNT) received a follow-up order. The installation contract for this core catcher cooling structure followed on in June 2011. The customer is the French firm QUILLE CONSTRUCTION, a direct subcontractor of Électricité de France (EDF).

By Jörg Grittmann



Reactor building under construction – deep inside, assembly of the core catcher cooling structure



Building site of the new reactor FA3 in Flamanville, France/Atlantic coast

Électricité de France SA:

Électricité de France SA" (EDF) is a state-dominated French electricity company that is quoted on the stock exchange and the market leader in France. The French state currently holds 84.8% of the shares. EDF currently operates 58 nuclear power plants worldwide in 20 locations. The total capacity of all power plants of EDF at the moment is 125,447 MW.

The installation of the core catcher cooling structure in the construction of the new EPR™ reactor in Flamanville is the first direct contract placed by EDF with Siempelkamp Nukleartechnik – "a reference project that will set the course for our future collaboration with the French energy supply company," is how Jörg Grittmann, the person responsible in Flamanville as project manager for the core catcher installation, describes the project.

Core catcher cooling structure Finland versus France: what is different?

It is only natural that comparisons with the successful supply and installation of the Olkiluoto core catcher in Finland will be made with this new, similar project of SNT. A major difference, however, is the enhanced protection against earthquakes included in

from left to right:
SNT construction management with installation plan for the core catcher cast elements

Cast elements waiting for their installation as core catcher cooling structure

Mounting of the steel structure for fixation of the wall elements



the contract from France. This core catcher consists of 861 cast elements with a weight of up to 1,680 kg and a steel structure designed as a welded construction. As a result of the additional protection against earthquakes in FA3, the number of steel parts increased from 1,115 to approximately 3,500 with a weight of up to 170 kg.

A further feature of the contract for Flamanville is the very strict schedule, as the final installation date for the core catcher is very critical. "In other words: The timeframe for the installation of the core catcher corresponds directly to other time-critical part-projects of the new construction. This would result in delays to the overall process – namely the integration of the reactor pressure vessel into the containment," explains Jörg Grittmann.

Core catcher: play it safe!

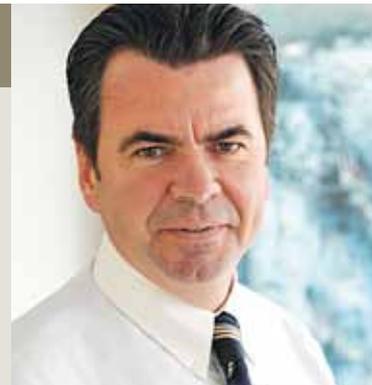
The core catcher supplements the primary safety systems of the EPR™ reactor, whose task is the reliable prevention, avoidance and management of nuclear incidents.

In the extremely unlikely event that all of these systems fail completely and there is a meltdown of the reactor's core, the core catcher is used to catch and permanently cool the molten material before it can reach the foundation.

In this way, the containment is maintained as the ultimate safety barrier. The core catcher is a complex structure made up of a large number of individual cooling elements consisting of ductile cast iron.

"Parlez-vous français?" – or the particular features of a French construction site

The installation of the core catcher cooling structure is performed by the 20-strong service team of SNT. In addition to the technical qualifications, one thing is required more than anything else: "Parlez-vous français?" is one of the most important skills required by our engineers and technicians on the French construction site. "Additionally, language skills in Arabic, Spanish or Rumanian are certainly also helpful for general communication during the construction of the reactor," explains SNT project engineer Stefan Engelhardt. Up to 3,000 employees of all nationalities work together here at the same time.



Parlez-vous français? – Philippe Cavel, our head in France

However, not only the construction management that is usual in such projects has been provided by Siempelkamp. Important key positions such as the health and safety manager, quality assurance manager and welding inspectors are also covered by the very highly experienced employees from the recently expanded service team with its project experience. Here too, language barriers have to be taken into account in addition to the technical expertise. The responsible position of health and safety manager in particular means that on every shift a corresponding employee must be present who speaks the national language.

Site access rules versus savoir vivre

Another special feature: For the access authorization of our employees to FA3, the French directive stipulated that forms of an unprecedented complexity had to be completed and drawn up. The leadtime for each employee for site access is up to six weeks. "Although they are absolutely necessary, the strict construction regulations mean that the French way of life is somewhat missing. Because after all, the Siempelkamp service team is working in a region with extremely attractive countryside where others go on holiday," says Stefan Engelhardt.



Setting in wall elements in the steel structure



Welding of the single elements for the floor steel structure



Mounted transition: inlet section between pressure vessel bottom side and core catcher for the conveyance of molten material

One special aspect should be mentioned here: the weekly working time for an employee in Flamanville must not exceed 37 hours on average – otherwise the construction site exit is blocked for the colleagues. Here, the SNT team had to adapt to strict regulations which are otherwise very unusual for construction sites. “Not only the strict construction regulations for the new construction are provided for by the French nuclear regulatory authority ASN (= Autorité de sûreté nucléaire), but also the physical well-being of the employees. For example, when an ASN employee discovered that the SNT employees did not have any bottles of mineral water,” reports Stefan Engelhardt, whose experience of France was and is very important for this project. “However, we were able to calm the regulatory authority’s fears: German employees do not die of thirst either.”

Quality check and logistics

The entire installation is under the strict control of the subsequent operator EDF and the ASN. Strict monitoring is carried out to ensure that all quality assurance measures are complied with and

implemented. A great deal of attention is paid to the quality of the welded connections to be provided by Siempelkamp. The highly trained personnel from the SNT Service Department ensure that all requirements are carefully complied with.

It is also worth mentioning the logistical challenges of the project: over 4,000 parts have to be transported 25 km from the external store in Cherbourg to the “spreading area” – the area of the complex intended to accommodate, cool and stabilize the core meltdown over the long term – for the construction of the new EPR™ reactor.

The installation is carried out mostly in two shifts. Installation began in September 2011, and the successful conclusion of the installation is planned for December 2012.

One conclusion of this cooperation with our French customers: through the direct contract with the EDF we have further strengthened our business relationship. “An important basis for our cooperation is the already established business relation with Siempelkamp

Venting hose for dust formation and vapors; ceiling opening of the venting hose: coevally entry for the cast elements, the lift truck etc.



Assembly overview of the core catcher cooling structure





Floor steel structure of the core catcher cooling structure

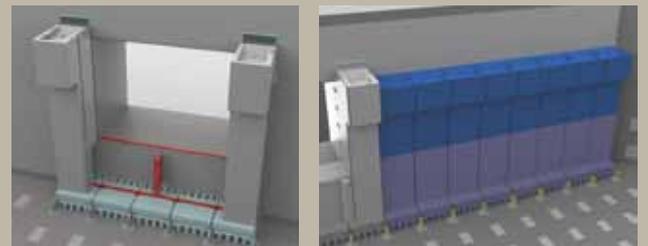
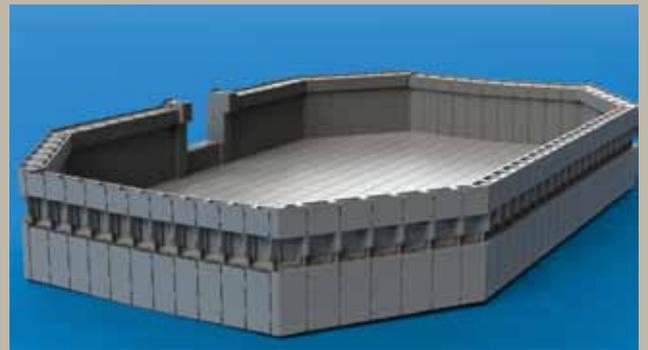


MSDG/Siempelkamp Tensioning Systems: They are supplying and modernizing stud tensioners for the French energy group. This success is also thanks to the development of the SNT location in Tours, represented by Philippe Cavel!" Jörg Grittmann sums up.

New reactor construction in Flamanville

The newly constructed nuclear power plant FA3 is located on the west coast of the French peninsula of Cotentin on the English Channel. The location is close to the municipality of Flamanville in the region of Basse-Normandie in the Département of Manche, approximately 25 km to the west of Cherbourg and 20 km south of the reprocessing plant in La Hague/France.

There are already two pressurized water reactors on the site, which were erected in 1979 and 1980. FA1 and FA2 provide power of 1,330 MW each. The construction of FA3 was begun in December 2007, and after the currently planned commissioning in 2016 will provide 1,600 MW of power.



3-D-design: completely installed core catcher cooling structure, transition, mounted wall elements

Siempelkamp service team on FA3 construction site



2009: ready-assembled cooling structure of the world's first core catcher in Olkiluoto, Finland