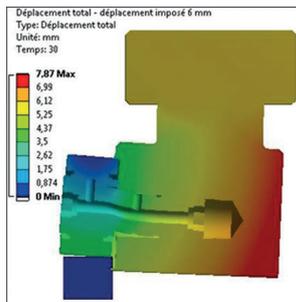
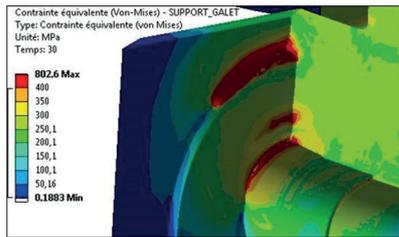


# Orano Projets Combining tests and simulations

At La Hague, the french company Orano Projets has revised the design of operculum shuttle components to meet new ASN requirements based on a series of tests and Cetim recommendations.



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## OUR CUSTOMER

**Corporate name**  
Orano Projets

**Workforce**  
1452 employees working in 42 fields ranging from mechanical engineering, to chemistry, nuclear safety and new technologies 4.0

**Business activity**  
Orano Projets is a subsidiary of the Orano group, which specializes in products and services with high added value for the entire nuclear fuel cycle, from raw materials to waste treatment. Orano Projets can provide services for all types of industries thanks to 40 years of experience in designing and implementing complex systems.

**W**ill the doors in the operculum shuttles transporting nuclear waste to the plant at La Hague behave as expected if a shuttle accidentally tips over? Orano Projets, the designer of the shuttles used at the nuclear spent fuel recycling site, combined testing and numerical simulations to provide a clear answer to this key question.

### Critical parts

Three carriers at La Hague transfer compacted vitrified waste between workshops as required for processes. The doors in the shuttles transported must not be blocked in position if the shuttles are accidentally tipped to allow for access to the

packages transferred. This is achieved using breaking parts which must in the event of an incident. In order to meet these new requirements of the French Nuclear Safety Authority (ASN), Orano Projets tested the suitable behavior of the breaking parts. According to Laurent Conseil, project manager at Orano Projets "We had to check that, beyond a determined load, the breaking parts would fail in order to prevent the plug-in units from opening and thus allow access to parts inside the shuttle".

### Combining tests and simulations

As the necessary test equipment and resources were not available in-house, Orano Projets entrusted this study to Cetim. Tensile tests were initially carried out on specimens sampled (along the shear axis) from the parts in question in order to identify breaking loads. Thanks to these tests, the behavior law of the material in

the axis of the component was determined, and a numerical model was prepared.

Orano Projets design and mechanical engineering offices used this model to modify the design of the breaking parts. Cetim conducted tests on the redesigned components and demonstrated that they sheared at the required load levels. Finally, the component adaptation process was accelerated thanks to two test campaigns combined with numerical simulations.

Laurent Conseil continued "Cetim engineers were proactive. Their proposals after the first series of tests provided guidance for our modifications to the design of the components".

## Cetim's asset

Cetim can provide advice for the design of products based on numerical modeling to size any mechanical assembly.



Cetim can boast expertise in test equipment and the associated numerical modeling process.