

Conversion of 60' Sgns Rail Wagons: a Cost Effective Solution for Transport of Lightweight Spent Fuel Flasks

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NTL3MA spent fuel flasks to be transported by rail from Dunkirk (France) to Vercelli (Italy)

NTL3MA Flask characteristics:

- Length: 5025 mm
- Outer diameter: 2240 mm
- Weight in transport conditions (empty): 53100 kg
- Weight in transport conditions (loaded): 57800 kg
- Weight of transport frame: 3500 kg
- Maximum weight in transport conditions: 61300 kg



NTL 3MA transport flask

A feasibility study showed that the maximum weight in transport condition is compatible with four axle wagons.

60' Sgns rail wagons were selected as the best basis for conversion



Standard Sgns rail wagon loaded with 20' containers

60' Sgns wagon characteristics:

- Length: 19640 mm
- Loading length: 18400 mm
- Cargo weight: 70 000 kg
- Tare weight: 18.5 to 20 te
- Axle load: 22.5 te
- Minimum curve radius: 75 m
- Maximum speed: 120 km/h

Key points:

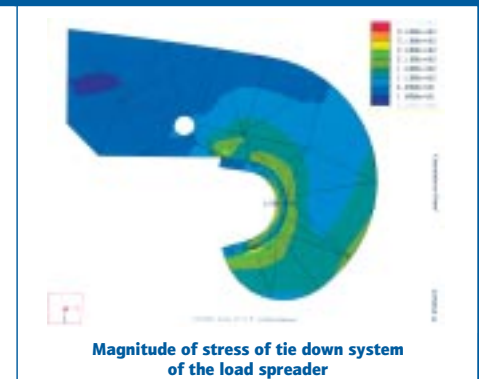
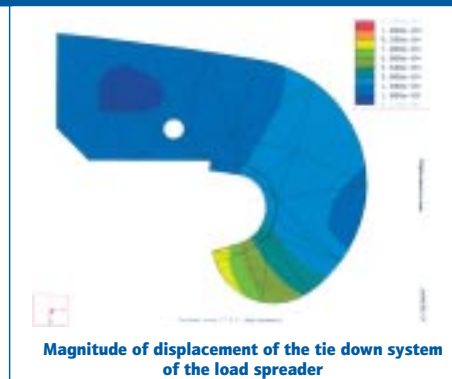
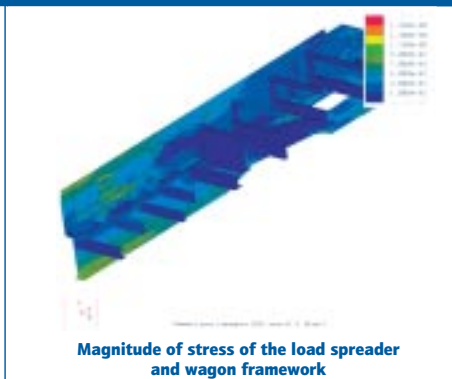
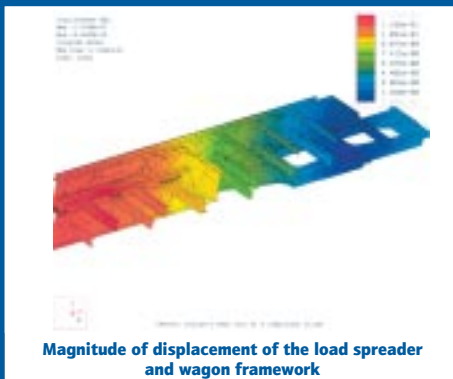
- Low tare weight < 20 te hence 8.7 te for modifications
- Excellent records of safety and stability
- Availability on lease of recently manufactured wagons
- Cost effective solution
- 20 km/h top speed margin for spent fuel transport

Two Sgns rail car were leased to AAE AG (Ahaus Alstätter Eisenbahn) for conversion

Specification for wagon modification

- Design of a load spreader frame to meet the loading pattern specification
- Design of a pair of sliding canopies to ensure access and protection in transport as well as heat transfer
- Satellite tracking system to be fitted on canopies
- Design of walkway platforms and safety ladders
- Design of drip tray and sump to collect rain water in transport
- Design of tie down arrangement for the transport frame onto the load spreader frame
- Design of down arrangement for the load spreader frame onto the wagon frame
- Wagons to be fully maintained, repainted and fitted with BNFL registered new axles before transport

Design of main components was optimised using FEA by "Les Ateliers de Joigny"



Operational experience



Final assembly of the modified wagon

- Design and conversion of two wagons completed in less than 7 months
- Tie down systems not requiring bolting material
- Successful handling trials
- 20 transport already performed in 19 months on most demanding transalpine route without any incident
- Excellent operational feed back confirmed by the turnaround inspections and by the first yearly maintenance operations
- High customer satisfaction
- Both wagons will be returned to their owner at the end of the transport campaign



Handling operation at BNFL Dunkirk Marine Terminal