

Use of Special Wire Rope Isolators for Deep Water Application

Socitec Group was contacted for the suspension and isolation of equipment that will participate in the observation and study of Neutrinos (elementary particles) in the Mediterranean Sea. This equipment will be transported and immersed in deep sea water at a depth of 2500 meters for 25 years.



Figure 1 Special wire rope isolator used

Socitec has provided 2 stages of isolation for this project. The first stage, directly connected to the equipment, will be immersed with its payload (500kg) and will have to withstand salt water exposure for 25 years at a depth of 2500 meters. In order to withstand this type of exposure and weight, the payload will be suspended by 6 special wire rope isolators made with an extremely high resistance material against corrosion. The shock absorbers need to be soft to maximize isolation during sea transport and immersion. The same material is used for the bars, cables and screws and offers very good behavior under salt water exposure. In addition, 2 added spacers in Teflon (or equivalent material) were fixed on each external bar to isolate the shock absorber against other metallic parts from the payload and/or interface plates and prevent any risk of galvanic coupling between metallic parts.

The payload with its suspension will be handled and transported on a specific frame, with a total transported mass of approximately 1960Kg. The second stage of isolators will be placed under the frame to isolate the whole structure and filter shock and vibration levels during transportation on land. Those wire rope isolators need to be stiff enough to avoid coupling with the main springs of the vehicle during transport. This is the perfect example of the usual antinomy between both soft and stiff isolators, often managed by wire rope isolators themselves but even better solved with a 2-mass system.

During the transportation phase, the first stage of suspension must be blocked, as there is a big risk of coupling and dynamic amplifications during the transportation if both suspension stages are allowed to work together during transportation. This blocking system must remain active up to the final destination of the equipment and before immersion.

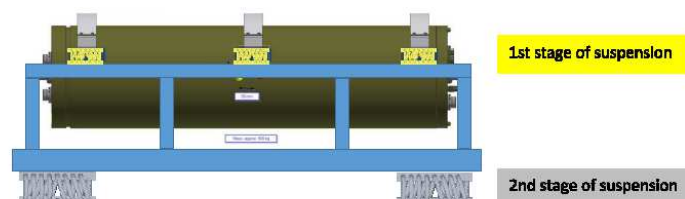


Figure 2 Different stages of isolation