

Transpower's experience with HVDC Refurbishments

SC B4 PS1 Question 6 - HVDC Systems and their Applications

What is the worldwide experience in refurbishing HVDC assets with manufacturers other than the original manufacturer? What are the obstacles for a vendor to refurbish an HVDC asset from another vendor?

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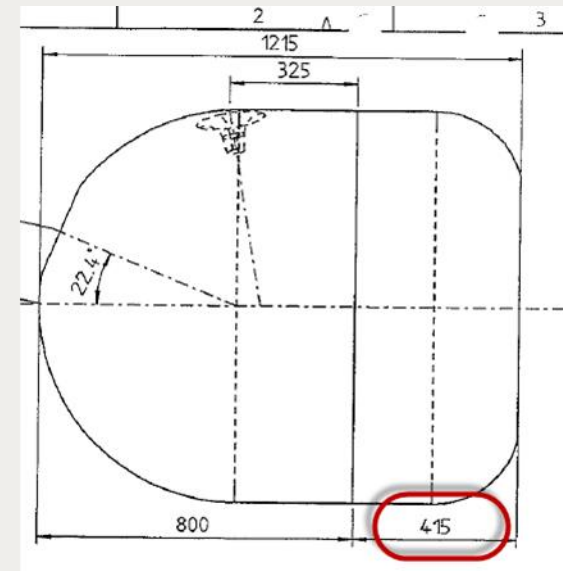
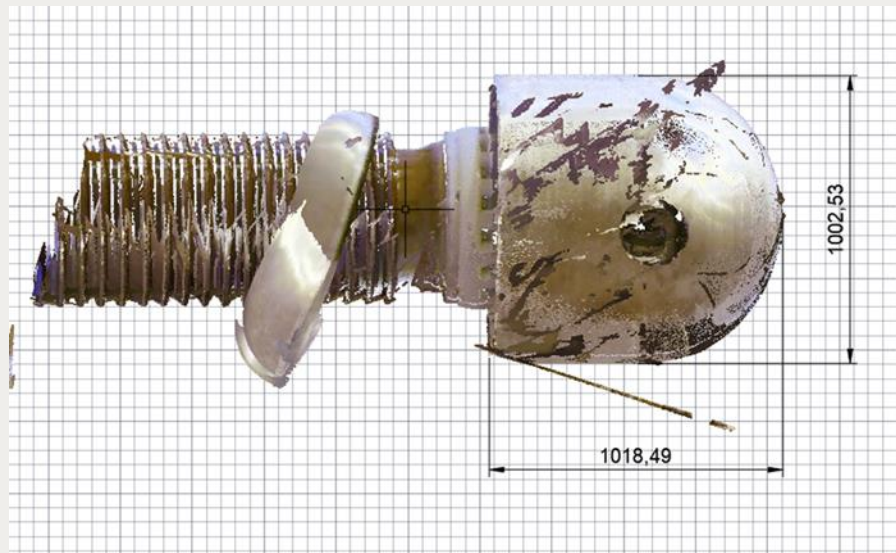
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- Q 1.6: What is the worldwide experience in refurbishing HVDC assets with manufacturers other than the original manufacturer? What are the obstacles for a vendor to refurbish an HVDC asset from another vendor?
 - Some limiting factors could be:
 - accuracy of original information provided to the owner by the OEM – i.e. availability of project specific manuals
 - accuracy of as-built documentation – i.e. capturing any modifications since commissioning
 - urgency – i.e. time available for developing a retrofit design
 - IP considerations – i.e. some OEM information cannot be shared with third parties
 - testing requirements – i.e. it may not be possible to test other vendor products to the required standard without having access to certain information
 - in-house expertise – i.e. how much support the owner can provide to other vendors
 - availability of original design information – i.e. transformer internal construction details
 - risk appetite of the utility – i.e. other vendors products could cause compatibility issues
 - outage availability for gathering additional information – i.e. other vendors may need to gather extra information from in-service plant

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Q 1.6 continued:

- Good technical specifications, test plans, and extensive commissioning tests would reduce the risk exposure. The replacement of the wall bushings, AC/DC yard assets, and auxiliary systems can be carried out by other vendors depending on the risk appetite and economic considerations.
- Interfacing should be given careful consideration and identical connections could be specified to minimise interfacing risks and installation times. 3D scans could also assist both vendor and the utility with interfacing and interference fit requirements.



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Q 1.6 continued:

- Having access to OEM original design information is advantageous in ensuring compatibility. This is very important if the utility has limited information to assist other vendors (i.e. lack of transformer internal drawings).
- The OEM engagement is recommended on high risk projects such as replacing Oil Impregnated Paper (OIP) insulated porcelain bushings on converter transformers with modern Resin Impregnated Paper (RIP) insulated composite bushings. This will minimise the risk of interfacing issues both mechanically and electrically (i.e. voltage stresses across internal bushing barriers).