

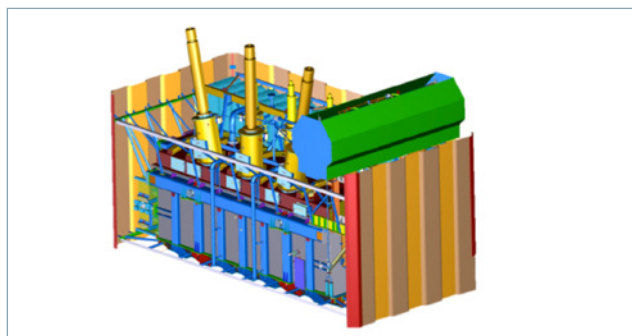
Delivery of the first Pretact® bullet-resistant transformer

As a foremost innovative supplier of power transformer solutions, Siemens has once again proved its capabilities to be unparalleled by sealing a historic deal for an industry premier: the first bullet-resistant power transformer unit.

Siemens will supply the 970 MVA three-phase generator step-up transformer with a voltage level of 345 kV to a US-based utility, and will play a major role in increasing the customer's powerhouse safety as well as the reliability for end consumers. The modular combination possibility of approved technologies and latest innovation is the key characteristic of Pretact. Thus, the concept allows for a versatile unit with 970 MVA at 345kV $\pm 2 \times 2,5\%$ – 24.8/21.1/17.3 kV with a link board to reconnect the low voltage side and voltage regulation at the high voltage side. Based on this the bullet-resistant transformer has been designed to fit five different generating stations in nine locations (with the same generator bus duct) and will be delivered to the customer in January 2017.

As with all innovations, an important first step is transforming fundamental research into solutions that provide real added value for customers. With bullet-resistant transformers, technology from external noise reduction systems was adapted to develop the bullet-resistant casing. The covering design consists of tank-mounted panels that protect the tank, cooling equipment, conservator, turrets, and the bottom of the bushings without additional foundations. The panels are supported by steel brackets, which allows for easy installation onto critical new or existing transformers and reactors. Some of the panels can slide to access pumps and fans for maintenance purposes.

The panels also reduce acoustic emissions during transformer operation. The offset of the bullet-resistant shield-



ing allows movement of air for cooling purposes, as well as maintenance work to be carried out on the equipment.

Why bullet resistant?

Power transformers are essential in the effective and reliable transmission and distribution of electricity. Serving as critical nodes, transformers have been engineered over decades to withstand operational risks such as lightning strikes, severe weather events, seismic activity, and power fluctuations. However, up until now transformers have still been vulnerable to human impacts, especially those carried out with high-powered ballistics. Siemens has taken significant steps to develop and test new materials and designs that enable our transformers and reactors to withstand ballistic attacks, ensuring their physical security.

Bullet-resistant transformers are part of the Siemens Transformers Pretact concept, which helps transformer operators to prevent failures, protect their assets from harm, and react rapidly in case of an emergency.

"With this order, Siemens demonstrates its ingenuity and pioneering qualities for the benefit of the customers. We are delighted to assist our partners not only in grid expansion, but also when it comes to facing risks and threats to their business," said Rick Boyd, vice president of Siemens Transformers USA.

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