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CASE HISTORY

ABB and NOMEX® Extending transformers' lifetime

Since the invention of the electric transformer, calculations, projects and manufacturing processes are in a constant evolution, in order to develop higher performance equipments with extended lifetime. For this, improvements on insulation materials are essential, increasing both performance and lifetime, as well as offering new operational possibilities.

ABB* know-how, allied to NOMEX® electrical insulation material, already applied on motors, generators and transformers for more than 30 years, offers transformers with a better mechanical and electrical performance, besides the extension in the operational lifetime of the equipment.

In special equipments, such as furnace transformers, rectifiers or transformers for mobile substations, where the duty cycle is critical for both mechanical and electrical characteristics, the quality of the equipment and its elements makes the technical

difference. To satisfy these conditions, the application of the NOMEX® electrical insulation is very important.

Replacing the conventional cellulose, traditional electrical insulation in the market, the NOMEX® electrical insulation is used according to the Hybrid Insulation System. The coldest areas of the transformer are isolated with traditional material such as cellulose-based papers, while NOMEX® is applied in the hottest areas (axial and radial spacers, wrapped conductors), offering:

- Stability in high temperatures
- High dielectric strength
- Low dissipation factor at operational temperatures
- Low dielectric constant
- Low moisture absorption
- Higher continuous overload capacity
- Higher capacity to withstand emergency overloads
- Higher resistance against cut and tearing

- Excellent resistance against compression, keeping a very rigid and stable structure

As an example, we can take a furnace transformer that presented, in the past, an electric failure due to aging of the paper insulation, causing as a direct consequence the loss of production. It was decided the acquisition of a new unity, with ABB technology and NOMEX® insulation material, not only to reach greater mechanical, thermal and operational performances of the equipment under operational conditions, but also to enlarge its lifetime. All these factors, allied, improve the reliability regarding the original equipment.

In this case, the additional investment was very small, this innovation was made only on the active part of the equipment, in regions responsible for electrical and mechanical support, looking for a better performance and an extended lifetime with a reduced cost.

The use of the NOMEX® electrical insulation offers not only the advantage

*ABB Asea Brown Boveri has got transformers know-how from Asea, BBC, Ansaldo, GE, National Industri, Stromberg, Westinghouse and others.

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of enlarging the equipment lifetime, but also supplying other necessities as transformers' size and weight reduction. This factor is determinant in such cases as mobile substations.

Due to the necessity of each client regarding its transformer (reengineering, lifetime extension, size/weight reduction, etc) it is possible to work with an excellent cost x benefits relation, looking to surpass expectations, always with the best solution using the excellent characteristics of the NOMEX® electrical insulation and ABB experience with more than 700.000 MVA power transformers built in the past 10 years.



ABB

ABB Ltda.
Av Monteiro Lobato, 3.285
Guarulhos SP
07190-904 Brazil
Phone: +55 11 6464-8417
Fax: +55 11 6464-8399
Customer Service: +55 11 3688-9007
www.abb.com.br

DuPont do Brasil S.A.
Advanced Fibers Systems - NOMEX®
Al. Itapecuru, 506
Alphaville Barueri SP
06454-080 Brazil
Phone: +55 11 4166 8449
Fax: +55 11 4166 8904
www.dupont.com/nomex

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