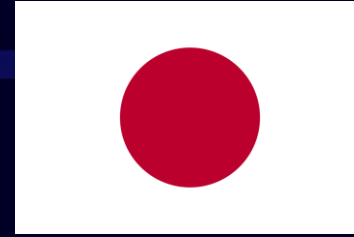


Paris Session
2022



Case of Offshore floating platform transformer

SC A2

PS1 / Q1.1

Ryo Koyama

Kohei YAMAGUCHI, Japan

HITACHI
Inspire the Next

Question and our contribution

Question:

What are design challenges for transformers installed in a nacelle with high range of vibration, shock, and special requirements? What are the best solutions for volume and pressure changes inside transformer considering hydro-compensator, N2 Tank, expander, and open breathing system?

Answer:

25 MVA silicone liquid immersed transformer was developed for offshore floating platform with satisfying the special requirements such as;

- (1) influence of swaying
- (2) limited and enclosed installation
- (3) environmental issue in case of liquid leakage

Group Discussion Meeting


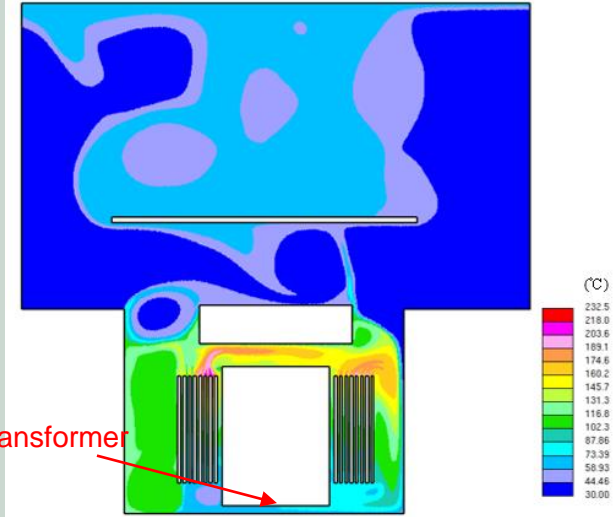


Challenges and solutions (1/2)

No	Challenge	Solution	
1	Special swaying	<ul style="list-style-type: none"> ✓ Additional supporting on active parts, fixing insulation material in the winding, and bolt tightening on core lamination are applied. ✓ N2 tank system with a separate N2 space is also applied and it was checked the pressure drop vs saturated vapor pressure for bubbling at the lowest ambient temperature. 	
	Item		Requirement for the transformer
	Frequency		0.1 Hz (Very low frequency)
	Inclination		Less than 11.8 °
	Vertical Acceleration		0.1 G
	Horizontal Acceleration		0.56 G

Group Discussion Meeting

Challenges and solutions (2/2)

No	Challenge	Solution
2	<p>Limited and enclosed installation area at offshore substation</p> 	<ul style="list-style-type: none"> ✓ Application of low viscosity Silicone liquid leads approx. 70% reduction for installation area. ✓ Additional CFD to check heat circulation surround the transformer in enclosed area was conducted. 
3	<p>Environmentally friendly</p>	<ul style="list-style-type: none"> ✓ Low environmental impact liquid of silicone is applied. ✓ Silicone is chemically inert and decomposes into materials existing in nature through hydrolysis, photolysis and biodegradation.

Group Discussion Meeting