



Fleet Management – spending your service budget on the right assets

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Mr Laurent Allard, Diagnostic & Monitoring Engineer for Power Transformer.

Laurent joined ABB in 2007 and has worked for 6 years as a diagnostic and monitoring engineer on power transformers (PT) in the field: commissioning of PT, Standard Electrical Tests & Advanced diagnostics on PT, Low Frequency Heating Dryings (LFH), Condition assessments of PT. He then became in 2012 Engineering Solutions Sales Manager for PT. He is also at the head of “On-load Tap Changer (OLTC) Vibration Diagnostic Project” which is now a strong tool used for OLTC diagnostic on PT. Laurent is based in Geneva, Switzerland.





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Laurent Allard, ABB Sécheron SA, Switzerland
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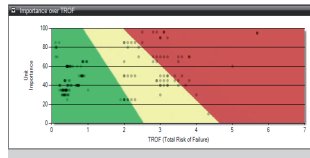
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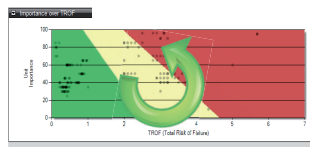
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Content

- Mature Transformer Management Program (MTMP)



- Dynamic Transformer Management Program (DTMP)



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Challenge – Need for higher reliability? Mature Transformer Management Program (MTMP™)



Engineering Solutions

Optimize investments: Maintain / Repair / Replace

- Which units present the highest risks in my fleet ?
- Which unit to maintain or repair in priority ?
- Should I maintain, repair or replace by a new unit ?

Solution: MTMP™

- Evaluate condition, remaining life time, risk of failure
- Define actions to mitigate the risks
- Modular analysis with 3 steps on a fleet on specific units
 - Fleet screening, Advance survey, Expert assessment

Benefits

- Provide more visibility and “predictability” to asset managers
 - Decide on preventive maintenance actions
 - Plan investments - invest in the right units

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MTMP™ - Output of a level 2 assessment survey Power producer: Example of action plan to mitigate risk

Visual Inspection, Advanced Diagnostics, Design Review (if available)

UNIT #	Mechanical	Electrical	Thermal	Accessories	Overall score	ACTIONS
	Winding	Arcing	Heating		95	Visual inspection and repair in factory/rewinding
	Tank			OLTC heating	80	Repair on site and OLTC overhaul
			Aged oil	Bushing	70	Oil regeneration / filtration and advanced diagnosis / change HV bushing
		Arcing		Thermometer	50	Exchange TopOil – thermometer / on line monitoring of DGA
				Silicagel	40	Exchange silicagel
					25	Standard maintenance actions and controls
					15	Standard maintenance actions and controls / 10% overload capabilities
					10	Standard maintenance actions and controls / 15% overload capabilities

Score: 0: good condition
100: bad condition

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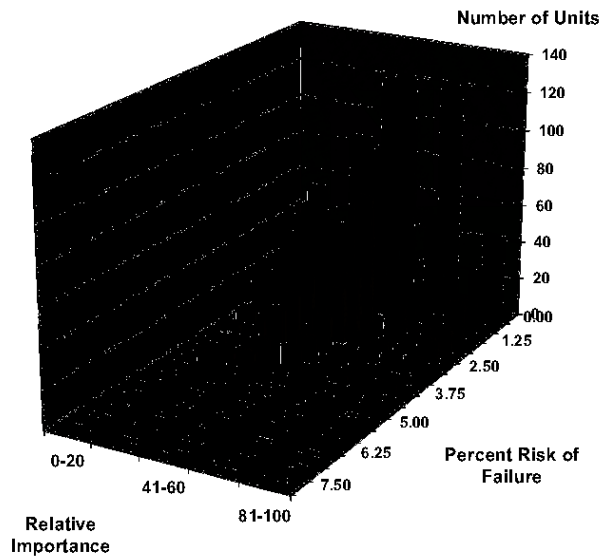




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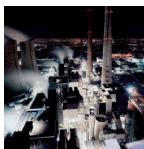
Transformer Risk Assessment Population Overview using ABB MTMProgram™



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MTMP™ - Success story Utility, USA



Customer need

- Increase reliability
- Plan investments for 10 coming years

ABB response

- Assessment of the condition of the fleet (MTMP survey)
- Evaluate risks of failure on 128 transformers
- Prioritize actions to optimize maintenance budget of 1'280 kUSD

Customer benefits

- Maintenance budget reduced by 24%
- Budget now spent on the right units contributing to a higher overall reliability
 - 11 risky units: budget increased from 9% to 25%
 - 47 medium risks: budget increased from 37% to 45%
 - 70 low risks: budget decreased from 54% to 30%

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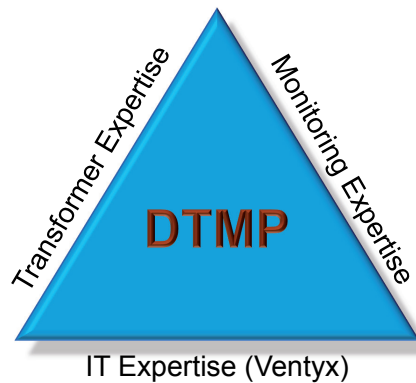


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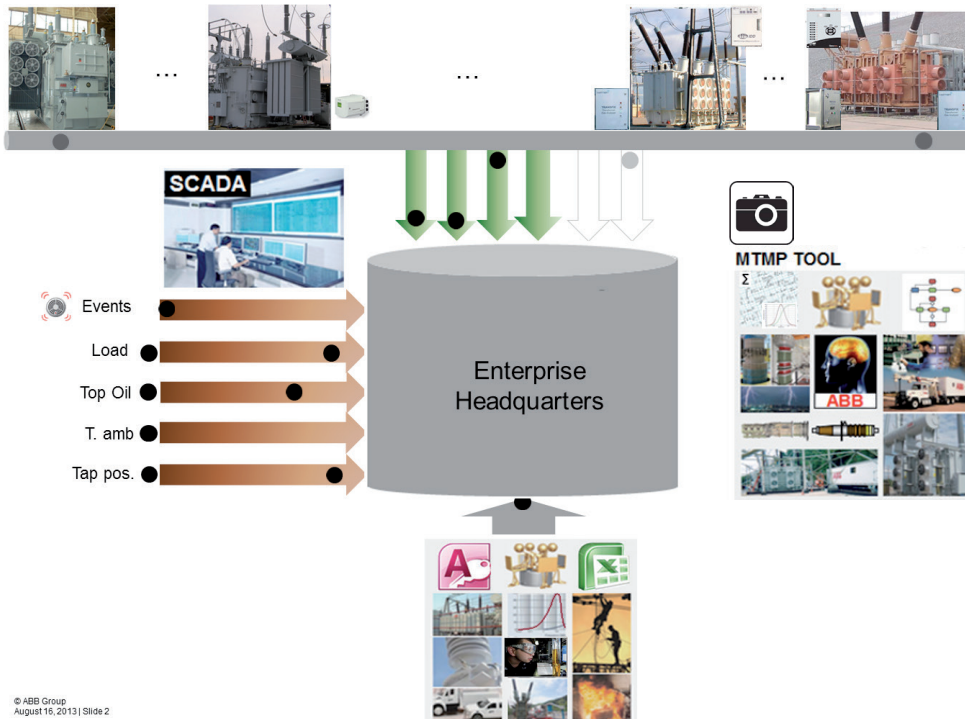
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DTMP (Dynamic Transformer Management Program) is based on 10 Years of working with MTMP

- ✓ With the recent increase of monitoring sensors, there is a need to move to a dynamic/real-time approach
- ✓ MTMP → snapshot of the fleet health,
- ✓ DTMP → dynamic, constantly-updated view



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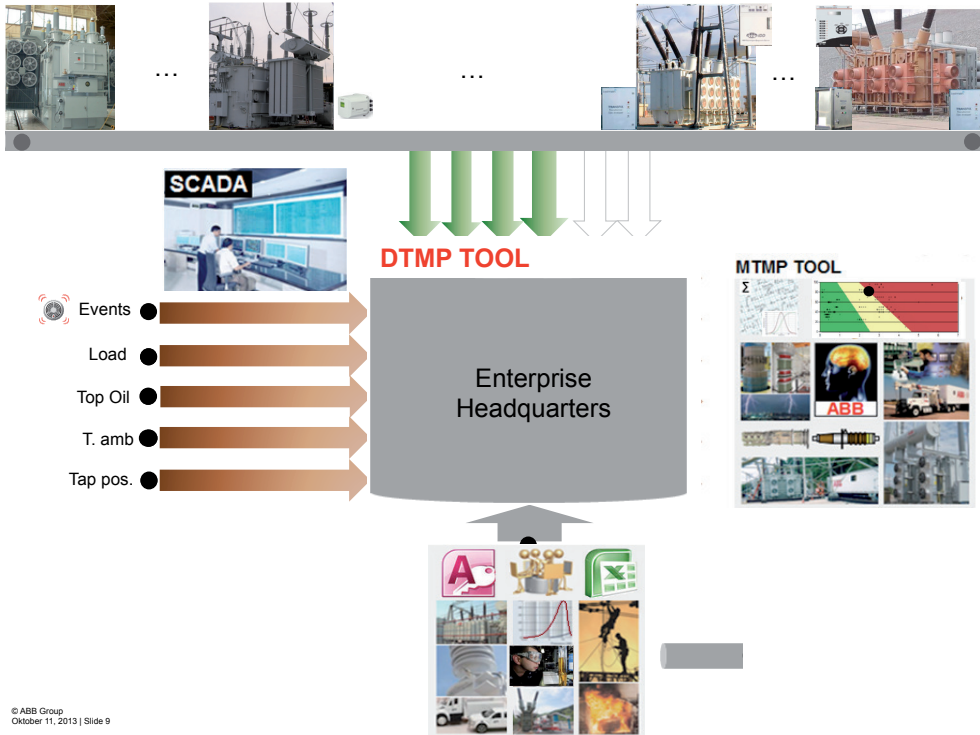


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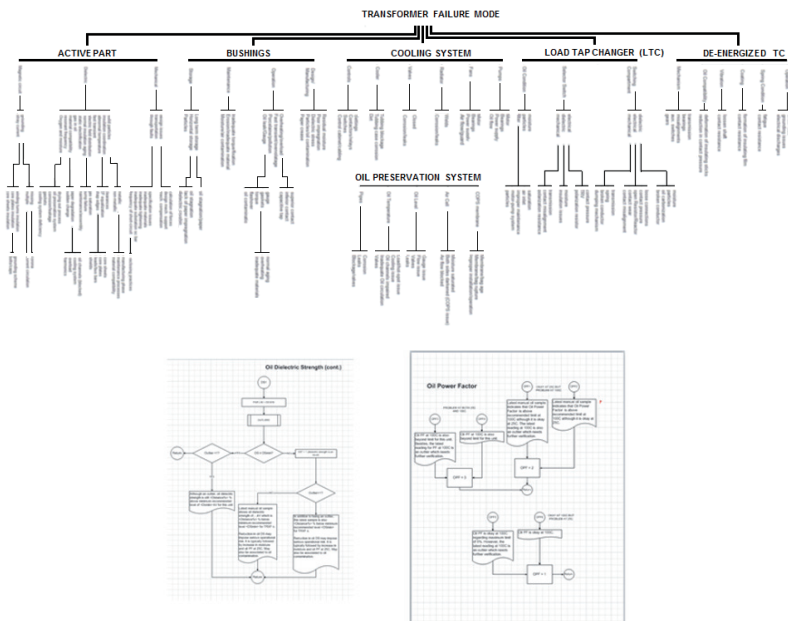
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Development Background - Algorithms



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DTMP Résumé



- ✓ After the baseline is created by MTMP, DTMP will automatically pull all monitored information into its database
 - ✓ Manual data input (as annual DGA, Furans, electrical testings...)
 - ✓ Maximizes the investments as condition assessment, monitoring equipments...
 - ✓ ABB & non ABB Transformers
 - ✓ Number of transformers unlimited
 - ✓ Customized solutions depending on data available
 - ✓ Transformer Risk of Failure updated daily - Assessments performed multiple times per hour to identify trends and probabilities
 - ✓ Messages and warnings issued if a potential problem exists
 - ✓ As more data becomes available, the automated assessment gets even better
- **Helps you to pinpoint units that need maintenance, to avoid failure, and allow you to spend your service budget on the right assets**

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