

A2- Power Transformers & Reactors

PS 3 Best Practices in Transformers and Reactors Procurement

Paper ID 10573

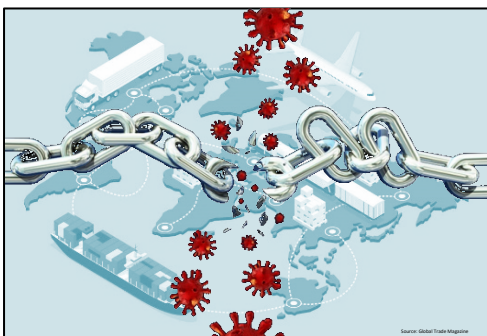
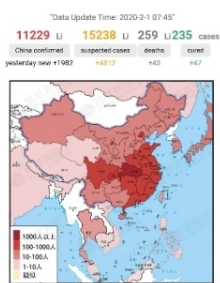
Experiences and Risks When Dealing With Remote Inspections of Factory Acceptance Test on EHV Inductive Equipment

Pablo Andrés Narváez Burgos

Interconexión Eléctrica S.A - For sharing the information and authorizing this presentation. UMS Group – For sponsoring my participation in the event.

Motivation

The need for new alternatives for remote FAT inspections has increased while the COVID 19 pandemic spread across the globe.

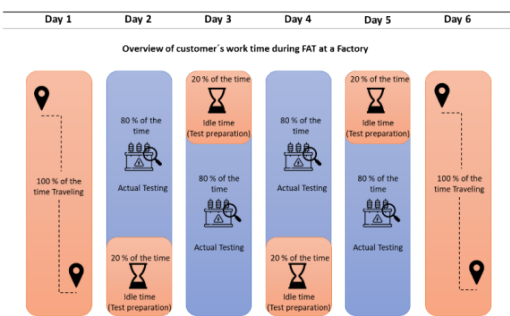


Method/Approach

Evaluation of the current methods, benefits, and risks of a remote inspection.

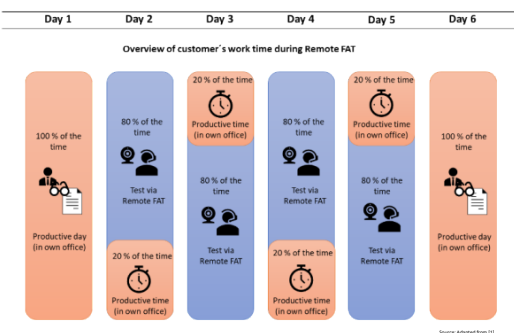
Before

Typical schedule of conducting Factory Acceptance Tests (FAT) with customer's visit to factory.



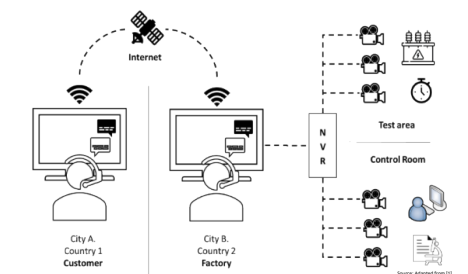
After

Options of online video conferences are set-up to conduct and review remote FAT

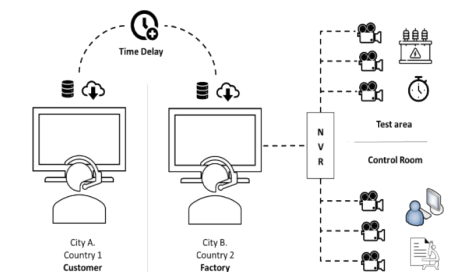


Source: Adapted from [2]

Synchronous Remote Inspection



Asynchronous Remote Inspection



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Interconexión Eléctrica S.A approach

Contractual obligations

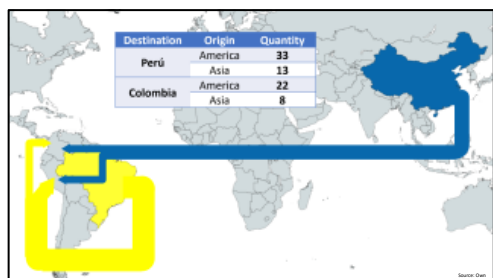
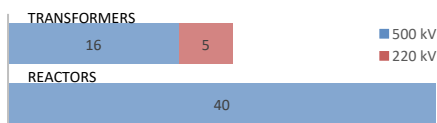
Warranties extension

Synchronous approach



Impact

UNITS REMOTELY TESTED



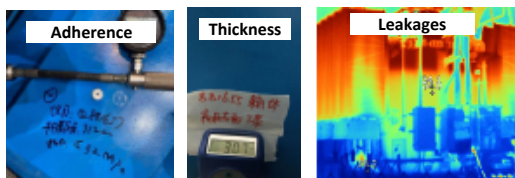
One Example - Main Tank

The verification of size, metal preparation, painting and welding of the tank are some of the most difficult elements to inspect remotely, even with additional cameras or photographic evidence.

Risk – Early Leakages / Deviation from Specs / Logistics difficulties



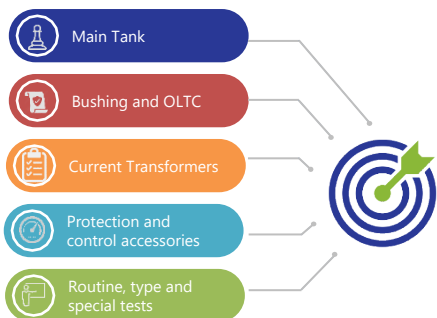
Preventive actions – Additional Mechanical Test / Bringing Third party local inspectors for specific painting validation. Simulation close to operating conditions for leakages.



Protective Measure
Stricter site warranties are contractually set to avoid delays, requiring higher quality standards from manufacturers.

Risk Assessment for remote FAT inspections

The structure of the analysis considered the **main sections of a purchase specification** of inductive equipment as well as the failure location identified in the existing literature.



The internal matrix for the assessment of remote inspection had close to **30 risks** per case, evaluating causes, preventive measurements, consequences, protection measurements, and financial, reputational, and time impacts for each equipment/project.

Conclusions

As previously shown, the risks, causes, and consequences follow a specific client by client and case by case analysis, and the main recommendation is to evaluate your risk assessment with the project team and explore possible financial, reputational, and time impacts over each scenario. **This article intended to acknowledge the difficulties and uncertainty that a remote inspection carries and to bring awareness to the possible effects that may cause an undetected deviation during a remote FAT.**

Although no quantitative, financial and reputational measurements were included in this paper, due to the sensibility of the information, each company **should evaluate and plan accordingly for future inspections as the impacts are high** when compared with other assets in a substation.

It must be clear that the inspections for EHV inductive equipment will change, and the responsibility of creating the best way to embrace falls upon the customer.