

# OLTC Course

On load tap changers

Clarifying all questions and concerns  
about on load tap changers condition  
and its evaluation



Course author: **Raka Levi**



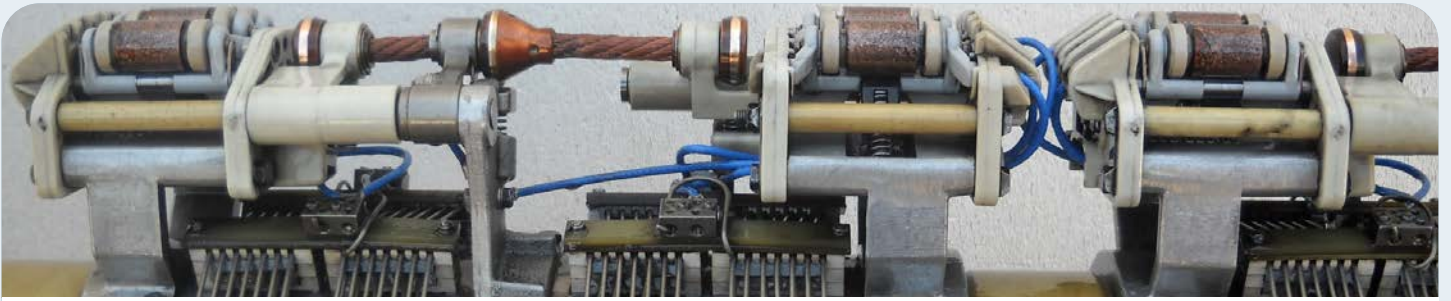
**RAKA LEVI** is electric-power engineer with over 30 years of technical experience in the field of asset management, condition assessment, power instrumentation, diagnostics and monitoring, tap-changer testing, and consulting services.

He is director of Levico, Inc. a consulting company in the USA.

During his career, he has operated from offices in Boston USA, Belgrade Serbia, Barcelona and Madrid, Spain to provide customized service to clients on all continents. Principle of operations: expert and consultant to test-instrument manufacturing companies.

**Education:** Dr. Sci. in the field of HV computerized condition assessment for circuit breakers at U. of Belgrade, and Master of Engineering in Electrical Power from the Rensselaer Polytechnic Institute, Troy - New York.

**Affiliations:** Senior Member IEEE (USA), vice-chair of the IEEE working group for revision of IEEE standard C57-152



# THIS COURSE IS INTENDED FOR:



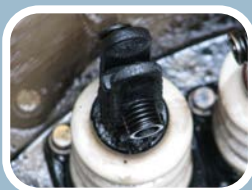
**Engineers** in operation and maintenance of power transformers

**Utility engineers**, both young and senior, especially those responsible for tests and diagnosis of substation apparatus

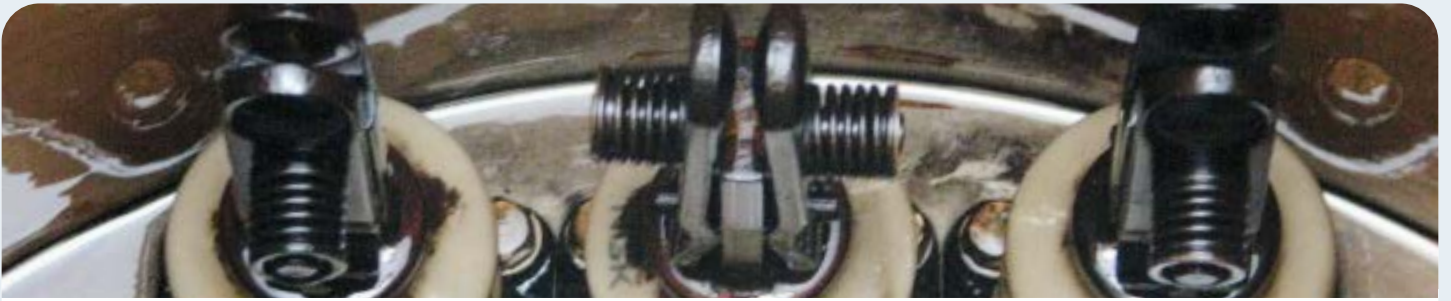


**Manufacturers** of transformers, tap changers, substation configurations, test instruments, etc.

**Anyone interested** in design and operation of tap changers, their condition assessment methods



**Staff** responsible for transformers, who want them to be more operational and more reliable



This course consist of the total of eight lessons on three levels, each of which is approximately 45 minutes long. The list of the lessons is the following:

## **BASIC LEVEL**

### **1. Basic principles and construction of On Load Tap Changers**

- › Definitions
- › Jansen patent
- › resistor types, reactor types, reading nameplate to understand the OLTC
- › three types of regulation used for transformers with OLTC

## **INTERMEDIATE LEVEL**

### **2. Resistor type OLTC**

- › Design characteristics: Arcing tap switch, Diverter and selector
- › ABB vs MR constructions
- › New vacuum types OLTC

### **3. Reactor type OLTC**

- › Principles of operation and design characteristics
- › preventive autotransformer, construction and application
- › one arm – two arms design of older models
- › OLTC vacuum types

### **4. Introduction to OLTC testing**

- › IEEE C57.152 guide
- › AC testing methods for condition evaluation
- › DC testing: winding resistance
- › dynamic resistance for operational characterization
- › demagnetization when using DC current
- › vibro-acoustic tests, on-line, off-line



## 5. Testing Resistor type OLTC

- › purpose of the test/reasons to perform diagnostics
- › Dynamic Resistance Measurement: history, testing, procedure
- › good and bad examples of test results

## 6. Testing Reactor type OLTC

- › DRM testing reactor OLTCs
- › motor current analysis as a diagnostic tool
- › good and bad examples of reactor graphs
- › switching sequence of complex OLTCs
- › various issues with reactor OLTC testing

## MASTER'S LEVEL

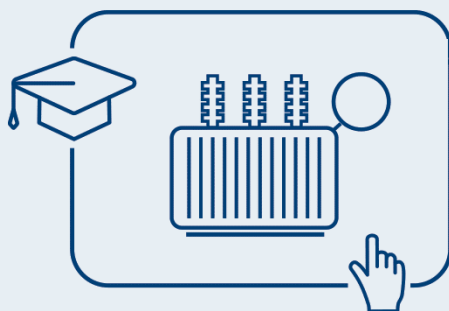
### 7. Analysis of test results

- › good bad results
- › resistor type OLTC
- › reactor type OLTC
- › vacuum type OLTC
- › various failures detected using test methods

### 8. Special cases

- › Series transformer – booster winding
- › Series autotransformer
- › Bias winding
- › Regulators





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