



ASSESSMENT IN THE RETURN ON INVESTMENT (ROI) OF TRAINING IN THE SPANISH NUCLEAR INDUSTRY

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MAIN OBJECTIVE

To design and develop a methodology to assess the effectiveness of a training activity carried out in a Spanish NPP

REFERENCE

SWITCHYARD CIRCUIT BREAKER FAILURE RESULTS IN MOTORING MAIN GENERATOR

On January 17st, 1997, actions to connect the **Fermi 2** main turbine generator to the grid were unsuccessful when an auxiliary switch contact on one phase of a 345-kV switchyard circuit breaker failed to close.

Operators did not fully isolate the generator before they opened the main generator field excitation breaker, approximately 30 minutes after the switchyard breaker malfunctioned, causing the generator to motor (unexcited, as an induction motor) for approximately seven minutes.

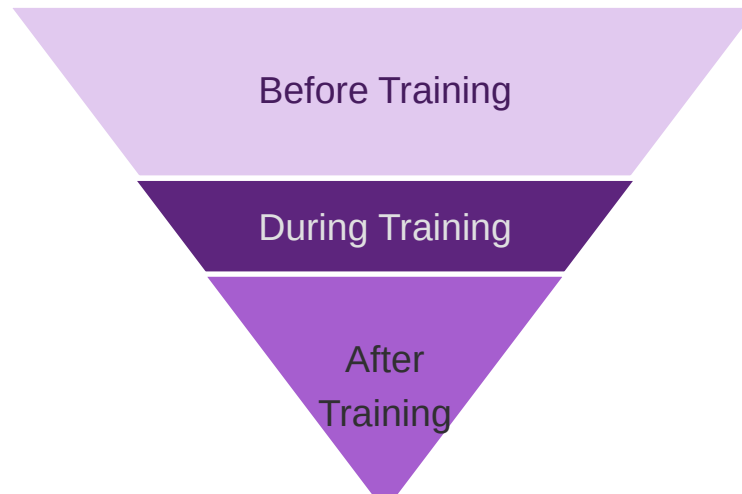
SIGNIFICANT ASPECTS AND CAUSES

Major equipment damage.
Ineffective teamwork.
Ineffective problem resolution.

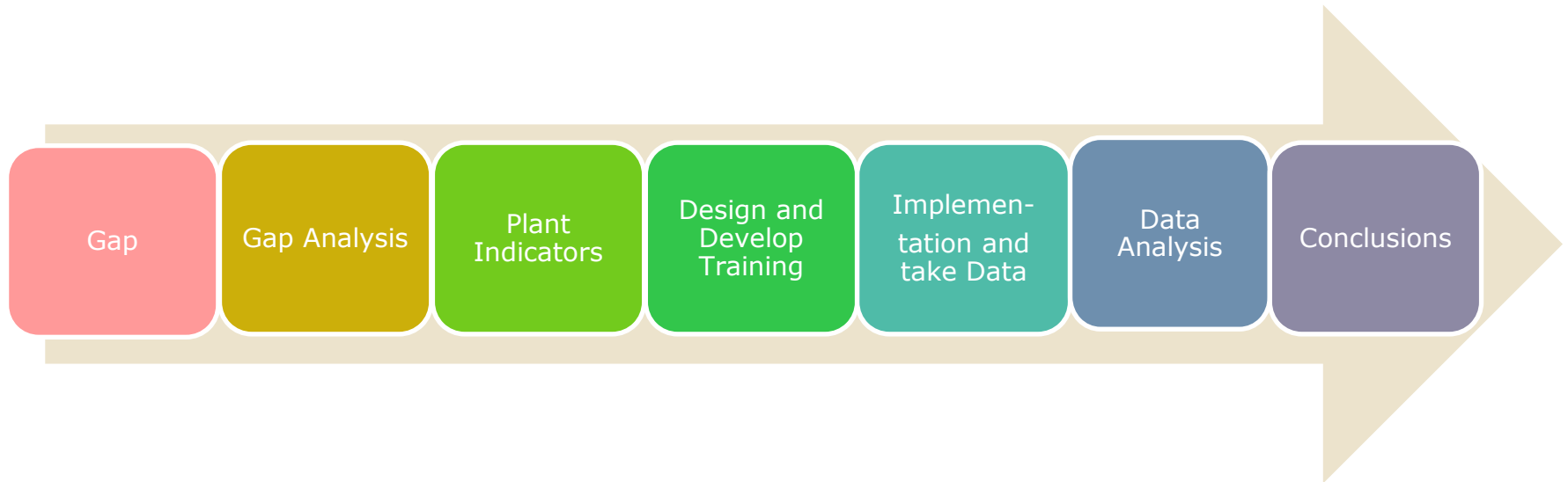
RESULT

A decrease of the risk of damage in the equipment on account off a clearance tags bad located in the switchyard was measured after the training.

Result: decrease of 63.66%



METHODOLOGY

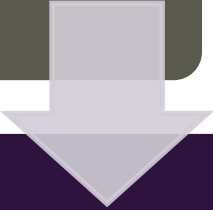


PERFORMANCE GAP

Field operators made a mistake while putting clearance tags in the switchyard.



A shift manager was carrying out a job observation.



Results gap analysis:

Failures in the identification and location equipments in the switchyard.

Field operators did not know which areas they were responsible for in the switchyard.

IMPLEMENTATION AND TAKE DATA

Training-Objectives

- ✓ Describe the equipments that belong to the nuclear power plant in the switchyard.
- ✓ Identify and locate the equipments in the switchyard.
- ✓ Execute the task: Put the clearance tags in the switchyard.

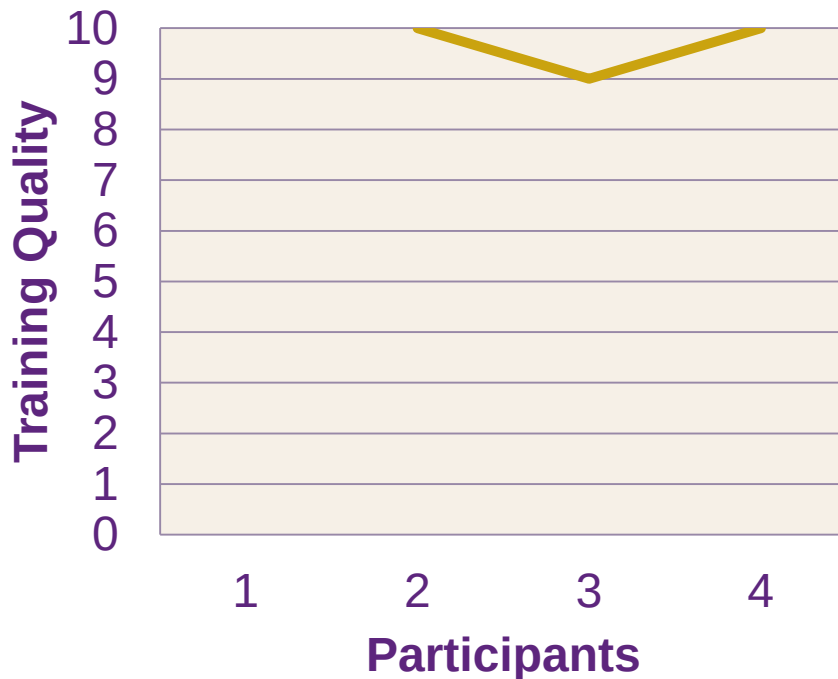


EVALUATION LEVELS

Evaluation levels
by Donald
Kirkpatrick and
Jack Philips

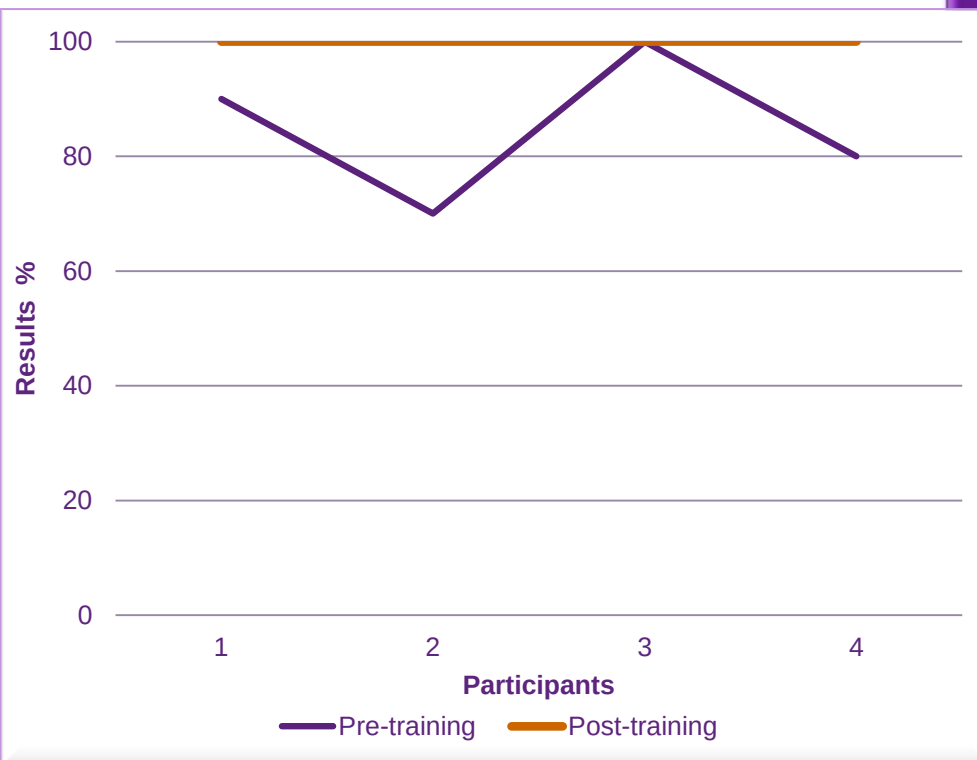
- Level 1 Reaction
- Level 2 Learning
- Level 3 Application and Implementation
- Level 4 Business Impact
- Level 5 Return On Investment (ROI)

LEVEL 1 REACTION



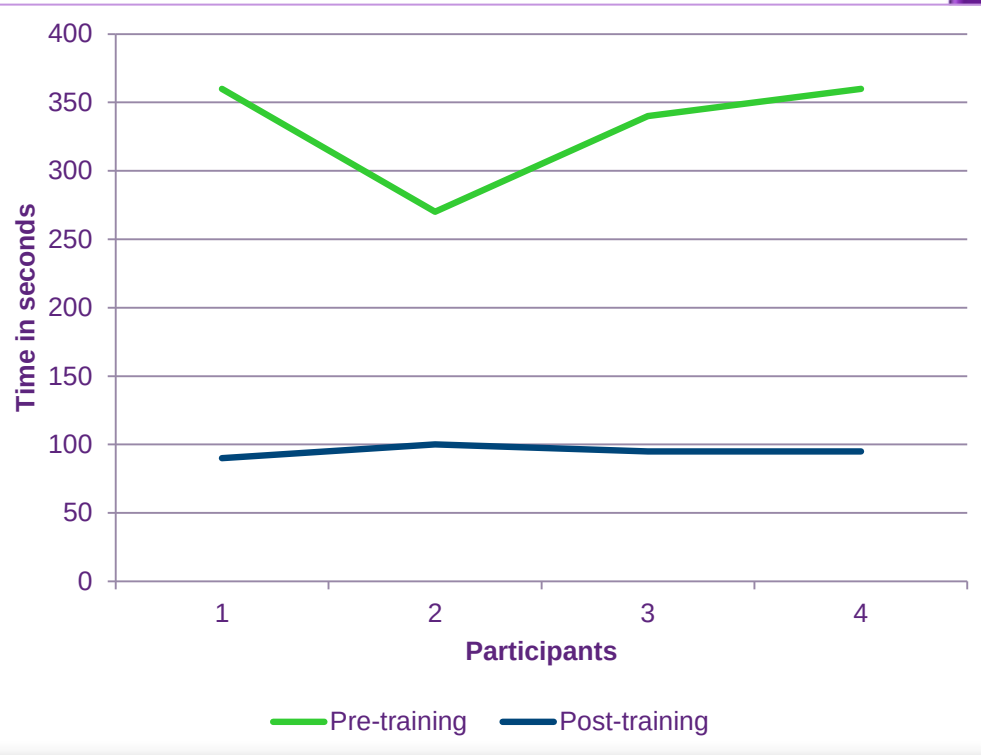
- ❑ Reaction data reveals what the participants think of the training and the trainers.
- ❑ The training was evaluated by surveys.

LEVEL 2 LEARNING



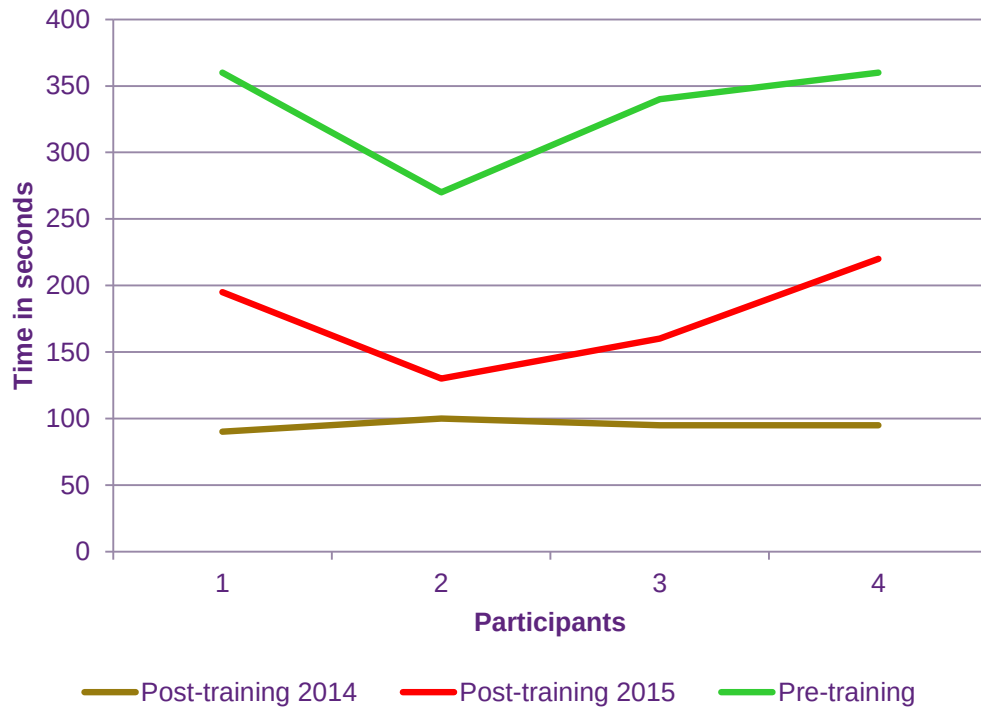
- ❑ Measurements focused on what the participants learned during the training.
- ❑ The training was evaluated by knowledge test.
- ❑ Participants learned new knowledge related to the equipments in the switchyard.

LEVEL 2 LEARNING



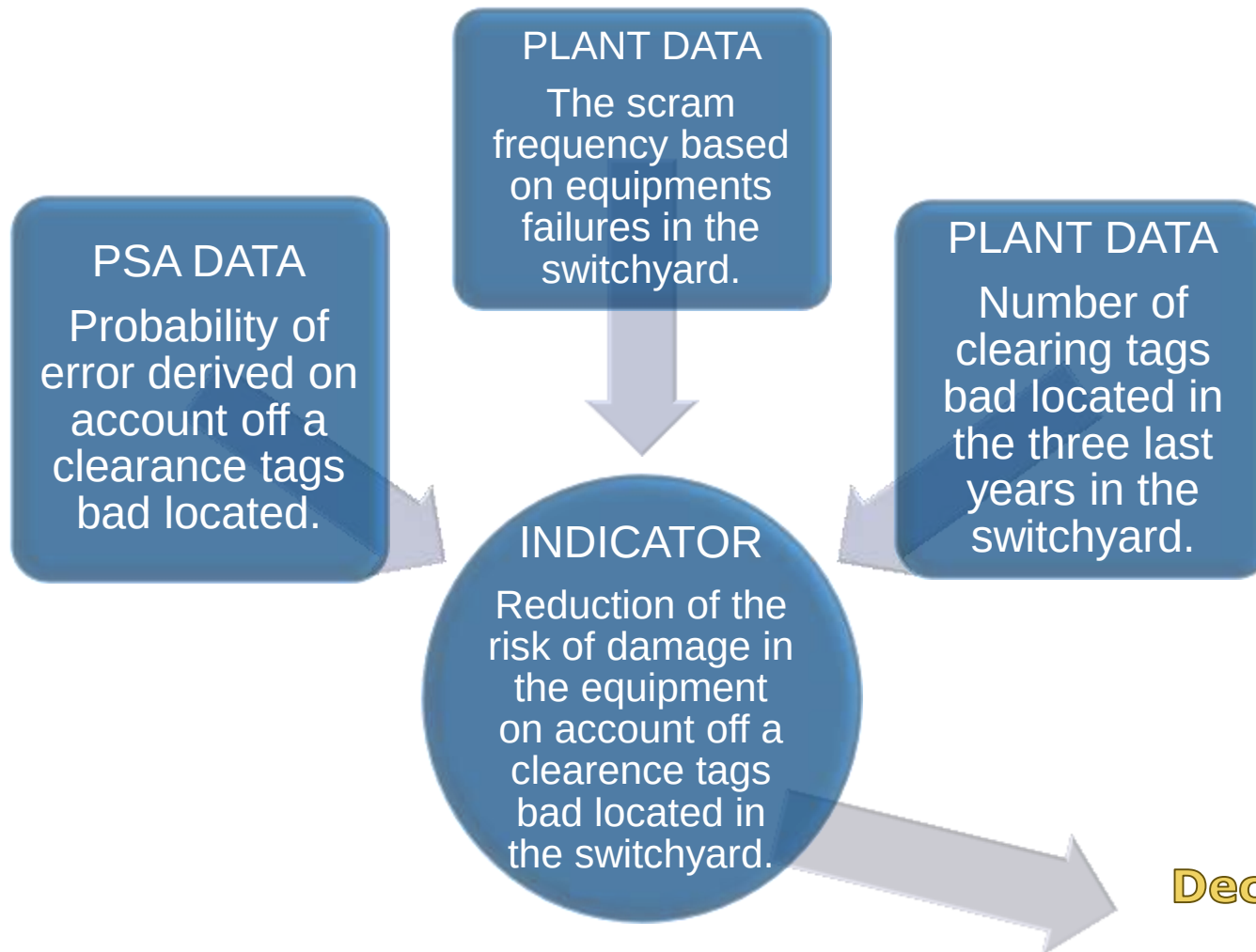
- The training was evaluated by skill test. The time it was taken as a measure of skill. The time participants spent looking at the equipment in the switchyard.
- An observation of skill practices verified that the team members acquired adequate skills.

LEVEL 3 APPLICATION AND IMPLEMENTATION



- It measures the behavioural change on the job.
- It is measured a year after the training has been implemented in the work setting.

LEVEL 4 BUSINESS IMPACT



This measure focuses on the actual business results achieved as a consequence of applying the knowledge and skills from the training.

LEVEL 5 RETURN ON INVESTMENT

INDICATOR

Reduction of the risk of damage in the equipment on account off a clearance tags bad located in the switchyard

**DECREASE OF
63.66%**

FIELD OPERATOR TASK

- Total task:118
- Task related with the equipment in the switchyard: 22

OBJECTIVES TASK RELATED WITH THE EQUIPMENT IN THE SWITCHYARD

- Total objectives:136
- Objectives related to the indicator: :18

OBJECTIVES TASK RELATED WITH THE INDICATOR

- Important: 9
- Normal:6
- Less Important: 3

IMPORTANT OBJECTIVES ARE OF 4,095% THE INDICATOR

FIRST-YEAR BENEFITS FROM REDUCTION OF COSTS ACCOUNT OFF TRAINING IMPORTANT OBJECTIVES

168.660€

vs

TRAINING COSTS FOR FOUR PARTICIPANTS

12.500€



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