

Performance Monitoring & Tracking Of MCCB & RCCB

Premalatha K ,Adithya K

Abstract: This paper presents Performance monitoring & tracking of MCCB which enables us to achieve Key Performance Indicator (KPI) effectively and reduces the time and cost for a company. KPI is a measurable value that determines how a company is achieving its business objectives effectively. Smart KPI- specific, measurable, attainable, relevant, time bound is applied to system. KPI for an organization usually happened during strategic planning, whether it is monthly, yearly or frequently the goal is to achieve the same objectives.

Keywords: Key performance indicator, magnetic pull, nominal rating, calibration.

I. INTRODUCTION

Miniature Circuit Breakers (capacity 10KA to 16KA) are electromagnetic device that encloses the enclosure in a moulded insulating material. It works from 2 seconds to 2 minutes in case of overloads and less than 2.5 milliseconds during short circuit faults. It encloses complete enclosure in a moulded insulating material. The housing is insulated and mechanically strong. The fixed and moving contact forms the switching system to which incoming /outgoing wires are connected. The current carrying parts are made up of electrolytic copper or silver alloy. During overload, electric arc is formed. Arc extracting & cooling are provided by arc splitter plates for arc interruption process. These plates are held in position by an insulating material. To force the arc between main contacts arc runner is provided. The magnetic tripping arrangement comprises spring loaded dashpot with magnetic slug in a silicon fluid and normal magnetic trip. A current coil in trip arrangement moves the slug against spring towards fixed pole piece hence magnetic pull is developed on trip liver. The armature of trip liver is attracted by the magnetic field produced by the coil in case of short circuits. A bimetallic strip around the heater coil is wounded to create heat depending on flow of current, this comprises thermal tripping arrangement. These strips are made up of brass and riveted and welded along their length. These will not heat the strip until tripping point for normal current, but if current is increased beyond the rated value strip is warmed, bent and trips the latch.

Selection Of MCB

1-nominal rating of CB-max full load current <current rating of MCB<cable rating

2-KA rating-capability of MCB to trip the circuit under short circuit conditions is expressed in KA. For residencies-

6KA is good, 10KA for commercial and light industrial applications.

3-types of MCB-different types based on their applications

RCCB-It is an earth leakage protection device that needs an external CB for basic protective functions.

II. ORGANISATIONAL STRUCTURE

SWITCHING AND PRE HOUSING ASSEMBLY-the housing design is from Italy, in this stage fitment of switches and prehousing assembly takes place.

MECHANICAL TESTING-this line involves calculation of display tension, display force, display axis position, axis cable stroke, peak force.

PCB SOLDERING-this process involves soldering circuited board into the housing structure.

RELAY CALIBRATION-the relay is fitted into system and is calibrated according to standards.

FINAL ASSEMBLY AND FUNCTIONAL TESTING-this involves fitting another housing structure and calculating the tripping characteristics.

TYPES OF COMMON FAULTS IN FUNCTIONAL TESTING-

NA-NOT ADJUSTABLE-relay cannot be adjusted in target setting

OR-OVER RANGE-same target setting cannot be achieved

NR-NO REARM-operation cannot be done

III. QUALITY TESTS -

ROUTINE TESTS-tests conducted on a daily basis, the following are its types

OVERLOAD TEST-MCB is given a current of 165A to know its overload capacity and the tripping force must be between 40-160N.

MODULE CALIBRATION BENCH-the tripping time must be within the specified standard time.

SHORT CIRCUIT TEST-

B-3 to 5 times of nominal current (30-50)

C-5 to 10 times nominal current

D-10-20 times nominal current

VOLTAGE TEST-2.5KV is applied for one cycle.

TYPES OF PROBLEM-MH-holing problem, MT-tripping problem, MD-other problem.

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Premalatha K, Associate Professor, Department of Electrical and Electronics Engineering, Kumaraguru college of Technology, Coimbatore 641049, Tamilnadu, India.

Adithya K, PG scholar, Department of Electrical and Electronics Engineering, Kumaraguru college of Technology, Coimbatore - 641049 Tamilnadu, India.

IV. TESTING RESULTS & MEASUREMENTS

B. Simplified Data Entry ForMcb Device Line

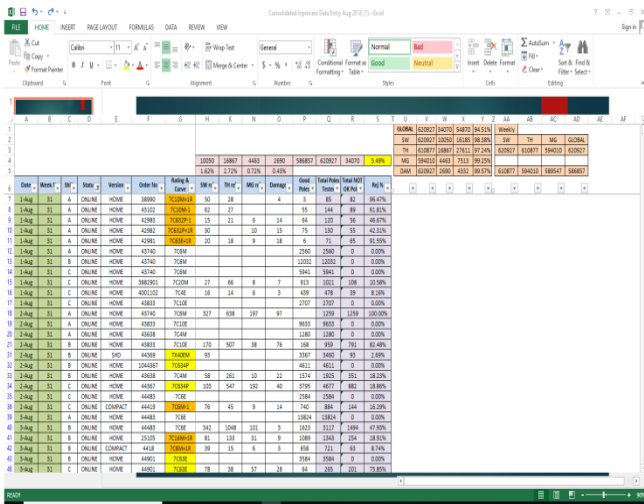
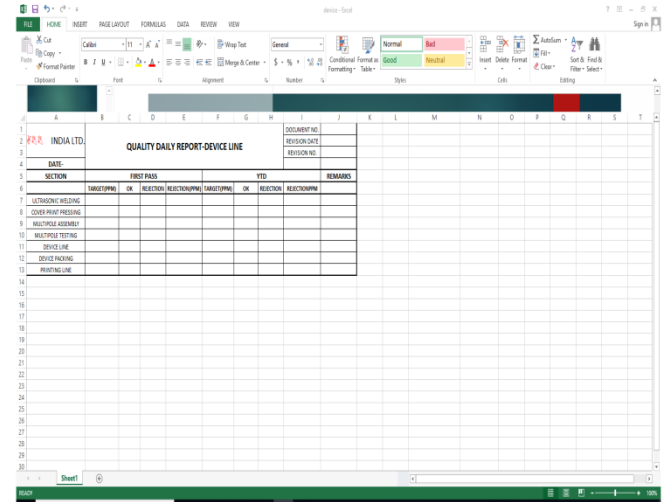


Figure 1 Daily Data Entry Report



C. SimplifiedData Entry ForRccb Line

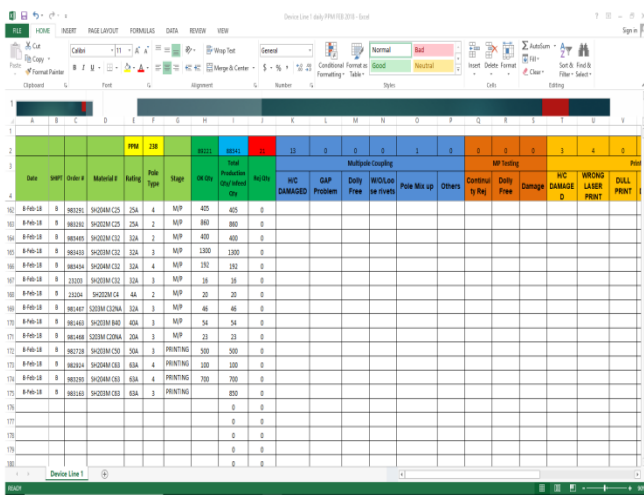
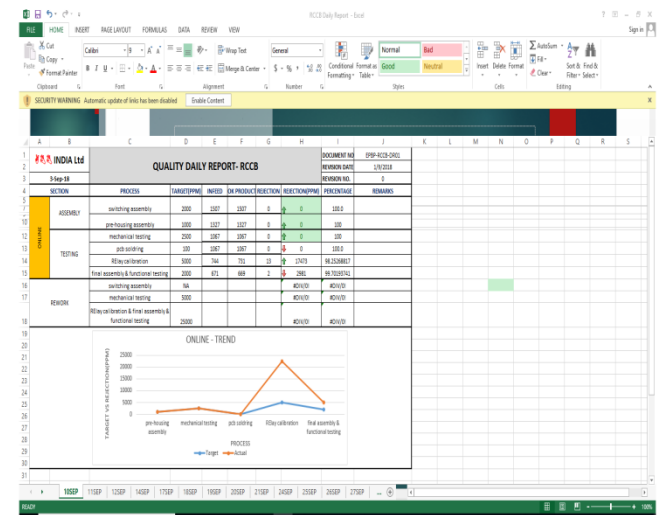


Figure 2 Daily Data Entry Report for Device Line



V. CONCLUSION

By performance monitoring and tracking, the quality tests performed in a big organization with many sub departments and stations can be automated which effectively reduces the time, cost, manpower in a uniform manner.

To improve the performance in MCCB and RCCB line as indicated by key performance indicator the following automation in entry scheme was done.

A. Simplified Data Entry ForMcb

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