To provide insight for enhancing wealth

System Integrity Test is conducted on Railway Signalling Systems to ensure Safety & Availability. The test is highly automated by which human errors are eliminated.

Evidence of test results is produced for further validation, if required.

DESCRIPTION

Testing of Signalling System for compliance to TOC / RCC is mandatory before commissioning of any signalling system. After commissioning also this test is required to be carried out periodically once in 3 years. First test is offline and the second one is online.

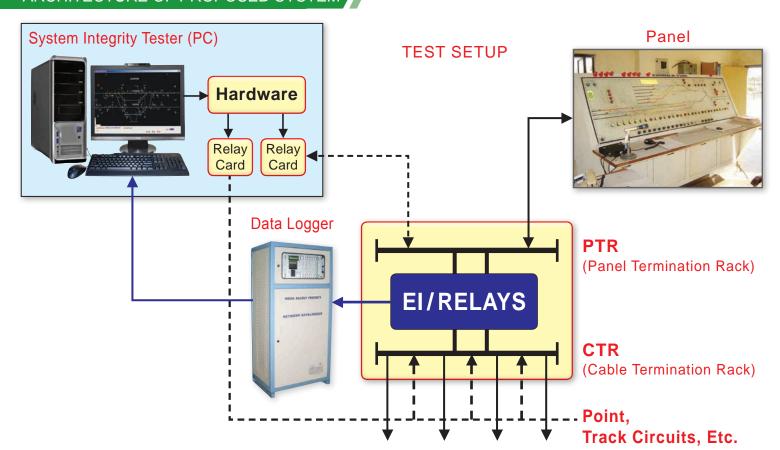
Implementation of interlocking (based on SIP) has the following stages:

- Preparation of TOC / RCC
- Design of logic circuits
- Wiring of logic circuit
- Testing and commissioning

We have automated the testing by which it is possible to find the mistakes in last 3 stages i.e. Design and Wiring of circuits and Testing.

- The conventional (manual) system has the following limitations
- Test procedure is not fully defined
- No document of Testing (Test plan)
- No evidence of Test Results
- No evidence of validation of test results
- No scope for verification of tests done, since no tangible output, results out of testing

ARCHITECTURE OF PROPOSED SYSTEM



SYSTEM INTEGRITY TESTER (SIT)



MODULES OF THE SYSTEM

Data logger:

- Processor based system
- Logs the status of Relay contacts
- Connected to PC by serial port
- Works on 24 v DC

Relay Driver:

- Processor based system
- Relay Cards to Drive a Maximum of 1024 Miniature Relays
- Controlled by software program in the PC
- Connected to PC by serial port
- Works on 24 v DC

PC (Tester software):

- Connected to Data logger and Relay Driver by serial ports
- Loaded with yard specific test software and software to communicate with relay driver and data logger
- Test status displayed on real time basis
- Report generation
- This system is applicable for only stations where Station Master's Panel is available.

USAGE/APPLICATION AREAS

Railway Signal Interlocking testing in Online & Offline for

- Panel Interlocking (PI)
- Route Relay Interlocking (RRI)
- Solid State Interlocking (SSI)

TYPES OF SYSTEM INTEGRITY TESTS CONDUCTED

- Negative test of controlling functions
- One Signal One Train Test
- Point Operation in Route Test (In Route setting type Panels Only)
- ◆ Route Checking Test (In Offline only)
- Route release test light engine and long train
- Test for route locking
- Test for back locking or route holding
- Test for approach locking
- Red-lamp protection test
- Aspect sequence control test
- Lamp cascading test
- Point track locking test
- SMKEY locking test for different assets
- Crank handle and LX Gate locking test
- Square sheet test(In Offline only)

PROCESS OF TESTING

- Representation of Table Of Control in terms of data logger inputs
- Instructions for carrying out tests are defined
- Tests are converted to a software program based on Table of Control
- Desirable test results are generated by software program based on Table Of Control
- Online test results are compared with desirable results through software program
- Status of the required relays are taken by the system from Data logger

BENEFITS

Testing Made Independent of human Errors by Tester

Testing to a large extent is made independent of testing capability of the Tester

Validity of yard Specific test data

Execution is faster than manual testing, hence can be repeated

Completeness and correctness of testing can be ensured

> Document evidence of Testing for further analysis is made available

Testing can be paused and continued to allow Train Movements Intermittently

Overall System validation

'R & D' Recognised by

Govt. of INDIA

Efftronics Systems Pvt. Ltd. ISO 9001: 2008 20000873 QM08

Approved by **RDSO** Govt. of INDIA Ministry of Railways

System Integrity

Tester

EFFTRONICS SYSTEMS PV