

TITLE OF THESIS: STUDY ON THE PERFORMANCE EVALUATION OF INDUSTRIAL RADIOGRAPHY FACILITIES VIS A VIS OPTIMISED SAFETY AND SECURITY

Index No. 13/16/E

Abstract:

Industrial Radiography (IR), one of the most useful applications of ionizing- radiation, possess risks to the operators and public, if proper safety and security measures are not taken. Out of different types of IR equipment, portable Industrial Gamma Radiography Exposure Device (IGRED) is mostly used in the field as it can easily be moved from one site to another due less weight and no requirement of power for operation. However, IR facilities handling portable IGRED are specifically facing safety and security issues like accidental exposure of the radiography personnel in the event of failure to use radiation survey meter (RSM), & due to manual cranking operation on account of less space availability in some cases like that of inside examination of the tanks and security hazard due to theft of the device either from storage room or during transport. In order to overcome the identified shortcomings and to improve safety & security for minimisation of accidental exposure of the radiographers and prevention of theft incidence; an IoT based radiation monitoring for field radiography using GM tube, microcontroller, Wi-Fi module and IoT ThingSpeak; an automated cranking system for operation of portable IGRED using different electro mechanical components like stepper motor, microcontroller, chain & sprockets, springs etc.and; an advance theft detection system (ATHEDES) using microcontroller, MPU 6050 motion sensor and Sim 900A GSM module have been designed and developed in this research work. Test results of these developed systems have demonstrated its usefulness in solving the problems faced by the facilities as well as by the regulators related to excessive exposures of the radiography staffs and prevention of theft incidence.

Keywords: IGRED, Exposure, RSM, Cranking, ATHEDES