

# Effects of work place ionising radiation construction essay



There have been increased concerns about the effects of work place ionising radiation on the health and safety of workers over the years. As we go along, this paper will show and compare legislation pertaining to work place exposure to ionising radiation in Trinidad and Tobago and the European Union.

## **1. 1 What is Radiation?**

Radiation is energy that is transmitted, absorbed or emitted in the form of particles or a wave.

Emissions emanating from radiation are all around us and can be absorbed readily by the human body causing adverse health effects. Radiation can be used to cure diseases and diagnose ailments. It can be transmitted from a variety of sources, be they natural (sun, cosmic, terrestrial, internal radiation or radon) or man-made (power supply, nuclear power plants, industrial activities, light sources, etc.).

Radiation can be in the form of Ionising or Non-Ionising. For the purpose of this assignment we shall be discussing Ionising Radiation.

## **1. 2 What is Ionising Radiation?**

Ionising radiation is radiation that is energetic enough when interacting with an atom detaches the electrons causing the atom to become ionized or charged.

Ionising radiation can be broken down into three (3) different types:

Alpha particles contains two protons and two neutrons and is emitted from uranium or radium, it can be stopped by sheet of paper or skin.

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Beta particles contains essentially electrons and is emitted from radioactive elements, it can penetrate the skin. It can be stopped by aluminum foil or plastic.

Gamma rays contain pure energy and are similar to x-rays and it is also emitted from isotopes. It can penetrate (pass through) the body and can only be stopped by water, thick concrete or lead.

## **DISCUSSION**

### **2. 1 Literature review**

For the purpose of this assignment we will be looking at legislation dealing with work place exposure to Ionising Radiation in Trinidad and Tobago and the United Kingdom.

Trinidad and Tobago does not have a specific legislation dealing with ionising radiation. The Radiation Protection Working Group was formulated in 2006 at the request of the Ministry of Health of Trinidad and Tobago to draft such a legislation, but this have not yet become law. Taking this in mind we therefore look to the Occupational Safety and Health Act Amended 3 of 2006 which is not specific about regulations dealing with work place exposure to ionising radiation.

On the other hand, when we look to the United Kingdom for legislation pertaining to ionising radiation, we find a vast source of information ranging from Ionising Radiation Regulations 1999 and the Ionising Radiation (Medical Exposure) Regulations 2000. I have chosen to look at the United Kingdom

Ionising Radiation Regulations 1999 as it pertains to work place exposure to radiation.

## **2. 2 Trinidad and Tobago – Occupational Safety and Health Act Amended 3 of 2006**

According to the Trinidad and Tobago Occupational Safety and Health Act Amended 3 of 2006 which states that every employer has a duty of care to his employees, he must then take all reasonable practicable steps to ensure the safety, health and welfare of said employees in his employ. In order to accomplish this, the employer must perform a suitable and sufficient risk assessment to identify all the hazards that an employee will be exposed to while performing a job or task in his employ. The employer is then required to reduce these risks associated with said hazards to as low as reasonably practicable.

The Occupation Safety and Health Act Amended 3 of 2006 states that a ‘code of practice’ can be adopted by the employer but does not specify, it is left solely to the discretion of the employer. When dealing with work place exposure to ionising radiation the employer can implement the ‘best practice’ begin used in said field.

One such ‘best practice’ to manage ionising radiation in the workplace, is Occupational Health and Safety Assessment Series for health and safety management systems (OHSAS 18001 certification).

## **2. 3 United Kingdom – Ionising Radiation Regulation 1999**

The United Kingdom Ionising Radiations Regulations 1999 came into full force in 2000 and replaced the 1995 Ionising Radiations Regulations. This <https://assignbuster.com/effects-of-work-place-ionising-radiation-construction-essay/>

Regulation pertains to ionizing radiation associated with the work place and not from natural sources.

The Ionising Radiation Regulations 1999 has forty one (41) regulations arranged in seven (7) parts and nine (9) Schedules, They are as follows;

Part 1 – Regulations 1 – 4 Interpretation of terms and General requirements

Part 2 – Regulations 5 – 12 General principles and procedures. Regulations 5 and 6 require employers to notify the HSE if and when working with ionizing radiation, a license must be acquired for working with x-rays, etc. Regulation 7, a risk assessment is required before any work involving radiation can begin. When all potential hazards have been identified, it is the duty of the employer to take all steps that are reasonably practicable to prevent accidents, limit the consequence if said accident occurs and provide employees with the equipment, training and information to prevent their exposure to ionising radiation. Regulation 8 deals with restriction of exposure, the dose employees or any other persons may be exposed to within any calendar year. It also deals with requirements for physical means and written procedures to protect employees. Regulation 9 deals with personal protective equipment; it must meet PPE Regulations 1992. And that said equipment must be stored and kept in good working condition. Regulation 10 deals with the maintenance and examination of engineering controls (warning devices, safety features) PPE, etc. Regulation 12 requires employers to prepare contingency plans and rehearsals of said plan.

Part 3 – Regulations 13 – 15 deals with the arrangements for the management of radiation protection. Regulation 13 controls the appointment  
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of radiation protection advisers, which can be contracted by the employer. These advisers have the duty of making local laws for safe conduct of work and ensure proper supervision of work. Regulation 14 deals with general training and information. Regulation 15 requires co-operation between employers where by if one organization is at risk because of the operations of other, the exchange of information to ensure full compliance with the Regulation.

Part 4 – Regulations 16 – 19 covers designation of controlled and supervised areas and their monitoring. Regulation 17 deals with local rules (written procedures and contingency plans) and the appointment of radiation protection supervisors. Regulation 18 deals with additional requirements for designated areas (warning signs, restrictions on access, dose assessment, radioactive contamination, records for non-classified workers, etc). Regulation 19 requires the monitoring of designated areas (tests on instruments and keeping records).

Part 5 – Regulations 20 – 26 deals with the classification and monitoring of persons. Regulation 20 deals with the designated of classified persons, (those employees who are likely to receive more than the specified dose). Regulation 21 deals with dose assessment and recording for classified persons. Regulation 22 deals with the estimated dose and special entries. Regulation 23 deals with dosimetry (measuring the dose of radiation emitted by a radioactive source) for accidents, etc. Regulation 24 requires medical surveillance to employees (classified persons, non-classified persons and persons about to be classified). Regulation 25 deals with the investigation and notification of overexposure by employers who must keep the record for <https://assignbuster.com/effects-of-work-place-ionising-radiation-construction-essay/>

at least fifty (50) years. Regulation 26 deals with modified dose limitation for overexposed employees.

Part 6 – Regulations 27 – 33 makes arrangement for the control of radioactive substances, articles and equipment. Regulation 27 states that wherever practically possible all radioactive materials should be in the form of a sealed source. These sealed sources must be tested for leaks every two (2) years and records kept. Regulation 28 requires employers to account for all radioactive substances for two (2) years from date of origination or from the date of disposal. Regulation 29 deals with the keeping and moving of radioactive substances. Regulation 30 requires employers to notify the HSE of certain occurrences (i. e. accidental release, loss or theft) and the employer must undertake an investigation to confirm these occurrence or otherwise. This investigation record must be kept for fifty (50) years if such incident never occurred it must be kept for two (2) years. Regulation 31 imposes duties on manufactures, installers and employers in relation to equipment used for medical exposure. Regulation 32 requires employers to investigate any defective medical equipment and keep record of the results for fifty (50) years if overexposure has resulted from undergoing treatment. Regulation 33 deals with the misuse or interference with sources of ionising radiation, which is prohibited.

Part 7 – Regulations 34 – 41 deals with the duties of the employees and miscellaneous provisions. Regulation 34 deals with general duties of the employees (employee must not knowingly expose themselves, where PPE is provided employee must take full advantage of said equipment, must take annual medical examination). Regulation 35 deals with the approval of <https://assignbuster.com/effects-of-work-place-ionising-radiation-construction-essay/>

dosimetry services and issues of certificate by HSE. Regulation 36 deals with defence on contraventions i. e. (Regulation 6 advance notice to HSE of intent to commence work with radiation, 7 deals with prior risk assessment if not initially met can be complied with at a later date, 27 prevention of leakage supplier's written assurance that the Regulation is fully complied with.

Regulation 37 deals with exemption certificates by HSE if the regulations are not appropriate. Regulation 38 deals with extensions outside Great Britain.

Regulation 39 deals with the transition from Ionising Radiation Regulation 1985 to the Ionising Radiation Regulation 1999. Regulation 40 and 41 deals with the modification in relation to the Ministry of Defence and revocation and saving.

## **2. 4 T&T OSH ACT AMENDED 3 OF 2006 vs. UK IRR 99**

When we look at the Occupational Safety and Health Act Amended 3 of 2006 compared to the Ionising Radiation Regulations 1999, you have to understand and interpret the Osh Act when dealing with ionising radiation because you cannot say that it does not have legislation about it. It may not be specific but it is there, being ignorant of the law is not an excuse. On the other hand the IRR 99 spells out the law to you when dealing with work place ionising radiation.

The Osh Act 2006 does not specify regulations to deal with work place exposure to ionising radiation, whereas the IRR 99 sets out specific regulations about handling, storing, specific dose limitations for employees (women of child bearing age, persons under 18, etc), procedures to follow (system of work, permit to work), accidental release, contingency plans,



designated areas, training, monitoring, engineering controls and redesign features.

The Osh Act 2006 requires employers to perform a suitable and sufficient risk assessment to identify all hazards associated with tasks undertaken by employees. The IRR 99 specifies that a suitable and sufficient risk assessment must be done before any work with radiation is to commence.

The IRR 99 makes specific requirements for the employer to protect his employees from ionising radiation. The Osh Act 2006 is vague on this issue and the responsibility is left solely on the employer to ensure the safety of his employees against ionising radiation and the 'best practice' in that industry is utilized.

## **CONCLUSION**

The United Kingdom Ionising Radiation Regulations 1999 contains certain requirements that must be met on:

Risk assessments and notifications

Dose limitation

Control methods of radioactive substances

Record-keeping

Regulation of work with ionising radiation

Safety of articles and equipment

## Dosimetry and medical surveillance

### Monitoring of ionizing radiation

This Regulation makes reference to the employer, safety representatives, radiation protection advisers and supervisors and the health and safety officers of their roles and responsibilities.

Whereas Trinidad and Tobago Occupational Health and Safety Act Amended 3 of 2006 does not specify requirements for work place ionizing radiation.

The Act can be interpreted as the employer must take all reasonable practicable steps to ensure safety, health and the welfare of his employees. In accomplishing this, the employer must conduct a suitable and sufficient risk assessment identifying all the hazards that an employee will be exposed to while performing a job or task in his employ. The employer must then reduce these risks associated with said hazards to as low as reasonably practicable.

The United Kingdom IRR 99 Legislation was used as a guide to draft an Ionising Radiation Regulation for Trinidad and Tobago, this, as stated before has not yet become Law. The draft Ionising Radiation Regulation will set out:

Frame work for emergency preparedness

Safety Standards for protection of workers and the general public

Road Transport Regulations

Use and disposal of radioactive materials

Environmental Protection

Contaminated land Regulations

Measures for safe use of high activity sealed radioactive sources and orphaned sources

Due to the increase in the use of radiation sources in the industrial and medical sectors, this Regulation is needed to govern the use of ionising radiation in Trinidad and Tobago.

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