Webology, Volume 18, Number 5, 2021
ISSN: 1735-188X
DOI: 10.29121/WEB/V18I5/13

Bridge of Relations in the Information System, Case Study; Radiation Protection and Materials

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ABSTRACT

MOIS, or "management of information systems," is the database's central nervous system, supplying vital nutrients and oxygen to the other three parts. The database was built as a unified system for managing networks in the nuclear and radiation sector by the NRA and the entities that provide technical assistance to the sector (TSO). Two information systems, the task system and the field system, are taken into account to meet the requirements of NRA and TSO. The interaction of components in tasks and fields system is inside lines of connections and bridges of relation accordingly. The article is addressed the development in creating and administering both systems using call lines. The book also describes how to convert data to information, or the opposite, to meet the requirements of scientific and regulatory workers and allow them to carry out their responsibilities with as little wasted time and energy as possible. Radiation shielding and materials science are examined as a possible bridge of connection case study. This association is proven by dosage conversion software application.

Keywords: Management of Information System, Materials, Radiation Protection, Database.

INTRODUCTION

The International Atomic Energy Agency (IAEA) created the Regulatory Authority Information System (RAIS) to aid its Member States in administering their regulatory activities in line with IAEA Safety Standards and guidance, such as the Code of Conduct on the Safety and Security of Radioactive Sources and supplementary Guidance [1]. By design, the software encompasses the following: 1) data from the national regulatory infrastructure, 2) buildings and departments, 3) radiation generators and accessories, 4) authorization, 5) inspection, and 6) inspection results. Law enforcement, Human resources, Radiation incidents, and Technical Support.

Even though this RAIS is focused on regulatory activities, it nonetheless reflects a global framework for perfect regulatory architecture. It is to be anticipated that the regulatory framework in various nations would vary. Some developing-world regulatory agencies function as

ISSN: 1735-188X
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autonomous entities inside a common-law-based legal framework. The regulator is supposed to operate in the public interest [2]. In poor nations, RAIS may not be part of a nationwide initiative. Not only that, but there are gaps in coverage that might be significant for certain nations. As a result, the Databank for NRA and its TSO was developed as a centralised repository for government data in Egypt [3].

An information system (IS) is a collection of components working together to generate data and knowledge [4]; ISs are constructed in a number of different ways to accurately represent data and knowledge, and these representations can be rendered in charts, diagrams, and other visual formats [5] for easier comprehension. Based on, the administration of information systems is a fundamental component in the databank that converts and retrieve all regulatory and scientific activities conducted by NRA and TSO. In addition, it provides the data and information required for the database's other three parts [6].

The scientific workers at TSO are worrying with research and development in many sectors to overcome the challenges that confronted the regulatory personnel when executing their responsibilities. Employees in the NRA's regulatory branch are also considered scientists since they are tasked with inspecting, examining, and assessing nuclear/radiological facilities before licensing them and creating rules for them. Therefore, IS is built as a scientific database bundles of data and knowledge. Consequently, the management of information systems (MOIS) is meant to meet all scientific expectations from job and areas for NRA and TSO.

Owing to the dissimilarity of tasks conducted in NRA and TSO, It is required to utilize some logical architectural framework for defining the components and workflows in the system to eliminate waste, and save time and effort. Additionally, It is confronted with obstacles such as the software language adopted, the transformation process of data/information or information/data, and the form of retrieving data/information.

THE ARCHITECTURAL PLAN

IS planning, organisation, and management are all handled by MOIS [7]. Meanwhile, MOIS is fashioned after the principle of "right time, right place, right cost, right form" [8], which means providing relevant data to the appropriate audience in an appropriate format at the optimal time and location. The architecture of the IS is therefore described as the processes and tools used to gather and organise information as well as to exchange it with other parties. A detailed description of the optimal system implementation.

In this paper, the evolution of the system design is broken down into three stages: first, gaining an understanding of the system at hand; second, analysing and designing the real concept of this system; and third, determining who will be responsible for the applicable imaginary design of the system in MOIS.

How It All Works

Functional needs, and in particular the need for implementation procedures, are the driving force behind the data/information flow within and between NRA and TSO. This instance makes use of a

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database to establish a permanent informational link between NRA and TSO.

NRA has clear and defined responsibilities. In other words, NRA is responsible for a variety of things, including enforcing the law, issuing licences, conducting reviews and evaluations, etc. Technical support operations, on the other hand, need investigation, study, and innovation in relevant scientific disciplines. Therefore, MOIS will be developed using two distinct information systems, the task system and the field system, which will yet share some common ground. An Examination of the True Idea

It would seem that in the case of a task system, each component is distinct from the others; licencing is distinct from review, and the legal framework is distinct from ethics considerations, etc. However, it was discovered via analysis of the numerous jobs that all system components share some common data/information. So, the duty of obtaining a licence essential details gleaned from regulatory framework, on-site inspections, and a thorough assessment of safety documentation. The same holds true for the field system. In the end, all components in task/field IS are connected to, overlapping with, and/or defining one another. A graphical projection of the plan view is conceived to facilitate an appropriate architectural design of the two IS in MOIS. In the case of the task system, each component is represented by a unique icon connected to the others by lines of connections, and in the case of the field system, by a bridge of relation.

The author has assigned names to the components; the lines reflect the informational or data relationship between the various parts of a task system. The exchange of data or information between components in a field system, however, reflects a genuine scientific link.

It's vital to remember that new components may be added to task and field systems while the systems are in use.

The squares in the two systems' network backgrounds represent call lines; in MOIS, call lines are a train of call orders that carry data and information from one element to another.

APPLICATION SOFTWARE LANGUAGE

The ORACLE programming language is one of several that is used to carry out MOIS. Oracle Database uses the PL/SQL programming language for its back-end. L/SQL is superior to many other languages because it uses modular code blocks and has strong error handling. Furthermore, during runtime, PL/SQL and SQL share the same server processes. Well-known for its secure features, it helps manage data, prevent unauthorised access, and ensure data validity. Reduced network traffic, error handling, portable applications, and procedural language are all benefits of PL/SQL.

ONE MOIS APPROACH TO IMPLEMENTATION

The modelling process in IS is the operation of organising and translating data and information into visual windows in a manner that the scientific worker may fulfil the process's objectives with minimal wasted time and effort. System analysts (SAG) and managers (SAG) draw upon SE (scientific staff) to carry out this function. Quite a few discrete actions make up this procedure;

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Employees in the scientific field are expected to provide a detailed description of the process (task or scientific area) they are working in, including the data utilised in the job's execution, as well as the data required to generate output. In order to fully comprehend the process (task/field), scientific staff SA and SMG will need to have several meetings.

To allow and identify the resources needed for each process, strengths and weaknesses, and identification of any risk elements, the three partners SAG, SMG, and SE engage in constant meetings. [6]. For the purpose of the SAG's analysis, the SMG will gather representative samples of data and information about the process and its interrelationships with other activities or fields.

Third, using the provided SAG analysis, choose the most suitable database window (input/output) views to characterise the system (design of the process). If you want to know where you are in terms of implementation (current state), the model you choose has to be able to describe the resources, processes, and actions that have been performed at each level.

parts of a system that perform a certain function. The resultant process model should also make appropriate choices for the input/output data's 1) kind (data and/or information, numerical, text, logic statement), 2) form, and 3) location (spread sheets, computer program). Now that the system analyst's blueprint is complete, the programmer can bring it to fruition.

In the fourth paragraph, the programmer is responsible for carrying out the process design.
Five, the visual procedure is dispersed on the local network to the designated scientific workers. Finally, the scientific staff, under SMG's oversight, will be responsible for validating the procedure (the windows). Users are sometimes only partially familiar with the system until it has been almost completed and tested. It's possible, nevertheless, that the user may find issues or areas for improvement when actually using the system to get things done. Questions should be sent to SMG, who will then forward them to SAG for action. Data and information in the form of database spread sheets, computer programmes, and software packages will be gathered for each task/field. This method involves repeated steps.

There is no set template for modelling processes; rather, the SAG will take into account needs, objectives, and tasks while deciding on a method. The iterative process is shown in

DATA/INFORMATION TRANSFORMATION

Data may be converted to information and back again, depending on the needs of the scientific staff and the degree of data protection. The procedure for accomplishing this goal. The first step is determining what kinds of information (yes/no, statement, etc.) scientific staff members need to do their jobs. The second phase involves data/information sampling, analysis, and filtering. Hardest part of finding the relevant data/information and designing their code for translation is rating the data. Information will be sent to the worker in the appropriate format based on the agreement and the importance of the information.

To elaborate, let's say that we have two workers, one of whom obtains the necessary permits (a kind of licencing) for choosing the disposal site, and another whose job it is to double-check the

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site's safety using a computer programme. They each provide each other the information they need to access the site. The second method results in dosages that are greater than what is allowed by law. The first staff member will get the calculated dosage. Through MOIS's software, these records will be converted to data "Rejection" and sent to the first staff member.

In the other direction, the first worker wishes to inform management through MOIS that they should move to an iterative approach in designing barriers (x), since the site has desirable qualities. A value and/or a range of values for x barrier will be derived from this statement. The second worker's iterations, based on the code already uploaded, will include modifying the data conditions at the barriers.

A CASE STUDY ON THE BRIDGE OF RELATION

The case study is based on the connection between material and radiation shielding in the field system. In this case, the squares stand in for the element data windows. The relevant information for this situation is gathered through call lines from all of the pieces. It is suggested that this connection be expressed as computer code.
The process consists of four phases: 1.

Calculations.

Third, gather the necessary information. Four - Disseminate Information Keying In Data
Metal, polymers, wood, earth, glass, radioactivity, cement, and others are the well-known major categories for materials. Additionally, this component will take into account a wide range of qualities, including chemical, physical, mechanical, magnetic, and others. The windows used for data input in the database application.

Calculations

In this work, we describe the different radiological doses (e.g., exposure dose, absorbed dose, effective dose, etc.) and discuss how to do dose conversion calculations.

Radiation exposure, the measurement of the amount of air that has been ionised by ionising radiation from photons is the first step in the dosage conversion.

Exposure rate (F), distance (r), source activity (), and the exposure rate constant () are all variables that rely on the kind of radionuclide utilised to produce the gamma rays.

The absorbed dose, denoted by the physical dosage number D, is the average energy that ionising radiation imparts to matter per unit mass. The joule per kilogramme, or J/kg, is a specific unit of measure in the International System of Units (SI) (Gy). The absorbed dose is defined as the amount of energy in terms of W1P that is absorbed by a certain amount of mass.

Alternatively, the data input windows needed in the area of radiation protection. These controls are visible to data input workers but concealed from scientists.
D= E. WIP

The stochastic health consequences of modest doses of ionising radiation on the human body are represented by the dosage quantity H known as the equivalent dose. While it is based on the physical amount of dose taken, it also accounts for the biological efficacy of the radiation, which varies with the kind and intensity of the radiation.

$$H = Q.D$$

Radiation affects different organs in the body in unique ways. A tissue specific organ weighting factor wT has been devised to give a particular organ or tissue T a specified exposure risk in order to evaluate the unique sensitivity to radiation exposure.

Effective dose E is the sum of the products of the organ equivalent dose HT and the weighting factor wT for each organ exposed to radiation. When assessing danger, the effective dosage is always taken into account.

CONCLUSIONS

Based on the specific tasks performed by the MOIS's scientific staff, two distinct information systems (IS) take the reins: the task system and the field system. Task field items are connected to one another by lines. On the other side, relations serve as a bridge connecting the element in the field system to its neighbours. Through the use of the phone lines, the two devices are connected to the network. To transmit the necessary data from the intersected windows, the database software represents the call lines as a train of call commands.

The case study provides an illustration of the variety of tasks that may be carried out to provide a link between radiation shielding and the field system's material components. The information in the bridge's material component is stored in database windows. There is also a graphical representation of the dose-response relationship in the form of computer code. There are four stages involved in running the computer programme: input, processing, gathering, and displaying results.

At long last, the database's IS has been organised in a way that's conducive to easy usage. IS will be configured in a logical and straightforward method for the scientific personnel (Seniors and Juniors) to progress their works on/from the Databank inside optimal time and efforts, despite all the challenges the system analyst experienced in design and procedures.

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ISSN: 1735-188X
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