

Therac-25 – college essay



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Therac-25 was designed for radiation therapy for cancer patients that was computerized and was assured that it was “ virtually impossible” to give overdose to any patient with it. When a cancer patient is advised for radiation he or she is told that because of the radiation process there will be a certain level of discomfort and so the patient is mentally prepared for that. The therapy takes more than one sitting and there is a feeling of slight sunburn on the area that is treated. But in some cases more than scheduled radiation was given and that resulted in death for some patients.

When doctor decides that a particular patient should be treated with radiation rays, he or she also prescribes how many rads (radiation absorbed dose) should the patient receive. These are instructions to the medical linear accelerator operator who will provide rads with all precautions. Initially this therapy engaged the operators a lot and they had to spend a lot of time arranging the machine for the treatment. With the introduction of Therac-25 this laborious work got easy for the operators. Along with the set up the computer also monitored the safety measures, which left the operators with nominal work.

When the cancer treatment facilities are housed in large hospitals they are monitored by experts from time to time but when these are in profit making organizations they are not properly checked at regular intervals. The radiation is used to treat cancerous tissues but if it is not given in proper proportion it is harmful. Therac-25 helped the radiation beams to enter into the body more deeply and without harming intervening tissues. It produced low energy electron beams for outer surface and high intensity electron

beam that entered into the body. This is the reason why Therac-25 was called a dual mode machine.

While deciding whether or not Therac-25 is worth, one will have to study the case narrative materials provided because here we are at the decision maker's seat. We also need to study the design of the machine and an overview of its history before coming to any conclusion. The safety analysis, overview of the software design and the problems faced by the operator too are some important aspects that have to be taken under consideration. The efficiency of Therac-25 might be controversial but the concept to minimize the work of operator was to let the operator help the patient.

Therac-25 is a large machine that is fitted in one room exclusively meant for it but the whole system includes hardware of the machine, software, physical surroundings, people involved, procedures, laws and regulations and use of data in it. All the things when put together works and gives the final result. A thorough investigation is needed considering all the fields and then come to any type of conclusion. If we declare that the programmer made mistakes and close the investigation it will be injustice and shortsighted approach.

This machine is operated with a mixture of technology and manpower and that makes it a machine based on socio- technical system. When we study the parts one by one we see that it is very difficult to point out problem in any one part in this case. It is not possible that such a big socio-technical machine can be made without hardware components so it is an essential part of the system. Workstations, mainframes, peripheral and connecting networks come under hardware section. Then comes the consideration of

software of the machine that includes operating systems, application programs and specialized code.

Sometimes it becomes difficult to differentiate between software and hardware. The software of any machine is programmed in such a manner that it will mismatch if tried in some other machine and will not work. When it comes to physical surroundings we see that the building, its location or its design all has an impact on the proper functioning of the machine. If the technology is prepared under one environment and put in some other then it is quite possible that the problem of mismatch might arise.

Then come under consideration the people that are involved like support, training, management, engineers, agencies etc. who are there to control the whole system and manage it too. The person involved in one role might have other roles to play and this leads to mismanagement sometimes.

Considering procedure focuses on the management models, rules and norms of the management and all the things that are done in an organization.

Procedures are very important parts that are cautiously encoded in software design.

Then comes the laws and norms portion that needs to be taken care of and that includes some rules of society like taking care of the privacy of the patient or the hospital. Rules of hospital and society sometimes clash that results in improper functioning of the system. This point should also be considered and that might differ from place to place. The design of socio-technical system includes the collection of data, how it is archived and its availability to concerned persons or other. The collection or archiving of data

is different for various socio-technical systems and it is uniquely designed for each one.