**1.2: APPROACHES TO HAZARD STUDIES: RISK PERCEPTION AND VULNERABILITY ASSESSMENT**

Integration of hazard study into a project environment is very much essential to identify risk perception and vulnerability assessment. However, proper integration of hazard and risk studies into a project is rarely achieved for a variety of reasons:

**-**time pressure

. Cost pressure

. Lack of understanding of the importance of the studies

. Lack of knowledge of the required techniques

**THE HAZARD STUDY PROCESS**

Hazard Studies are six (or even seven) stage process which is a structured approach to ensuring the safety and environmental performance of a project.

The six stages of hazard study are as follows:

|  |  |  |
| --- | --- | --- |
| Stage | Purpose | Timing |
| 1 | Ensure clear understanding of project aims including health, safety and environmental performance targets | As early as possible in the life of the project |
| 2 | Finalize Process Flowsheet and identify any particular issues | As soon as Process Flowsheet is  firmed up |
| 3 | Hazard & Operability study to ensure that design intent is met and that the plant meets Safety, Health & environmental objectives | As soon as P&IDs are firmed up |
| 4 | Pre-Commissioning check to ensure that design intent has  been met and the plant has been constructed in accordance with the design | Before commissioning, as soon as construction is complete |
| 5 | Post-Commissioning check to ensure that the plant is  operating correctly and in accordance with the design intent | Immediately after commissioning |
| 6 | Periodic review to ensure that the plant is operating in  accordance with the design intent and capture any  modifications made subsequent to commissioning | 6–12 months after commissioning |
|  |  |  |

Source: ON THE INTEGRATION OF HAZARD & RISK STUDIES INTO A PROJECT ENVIRONMENT

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**Vulnerability:**

Vulnerability of a certain system is generally defined as the **degree of susceptibility to damage** from a hazardous phenomena or activity. Vulnerability may be characterized as related to the anticipated damage s as follows:

1. Negligible or slight damage
2. Moderate damage
3. Substantial to heavy damage
4. Very heavy damage
5. Destruction

**Risk**

Risk may be defined as an existing threat to a system (life, health, properties, environment, cultural heritage) given its existing vulnerability. Risk is similar to hazard but it is not a potential it is a real threat. It can be said that risk is a function of hazard and vulnerability:

***Risk = Hazard x Vulnerability***

Risk represents the probability of harmful consequences or the expected damages resulting from interactions of hazard and vulnerable conditions.

In a metaphor hazard could be viewed as a **source** with a **beam of rays**, vulnerability as the **filter** and risk as the **beam of penetrating rays** through the filter affecting the system.