IN THE NAME OF ALLAH THE BENIFICIENT, THE MERCIFUL

The Institution of Engineers Pakistan
4th National Seminar on
Occupational Health, Safety & Environment

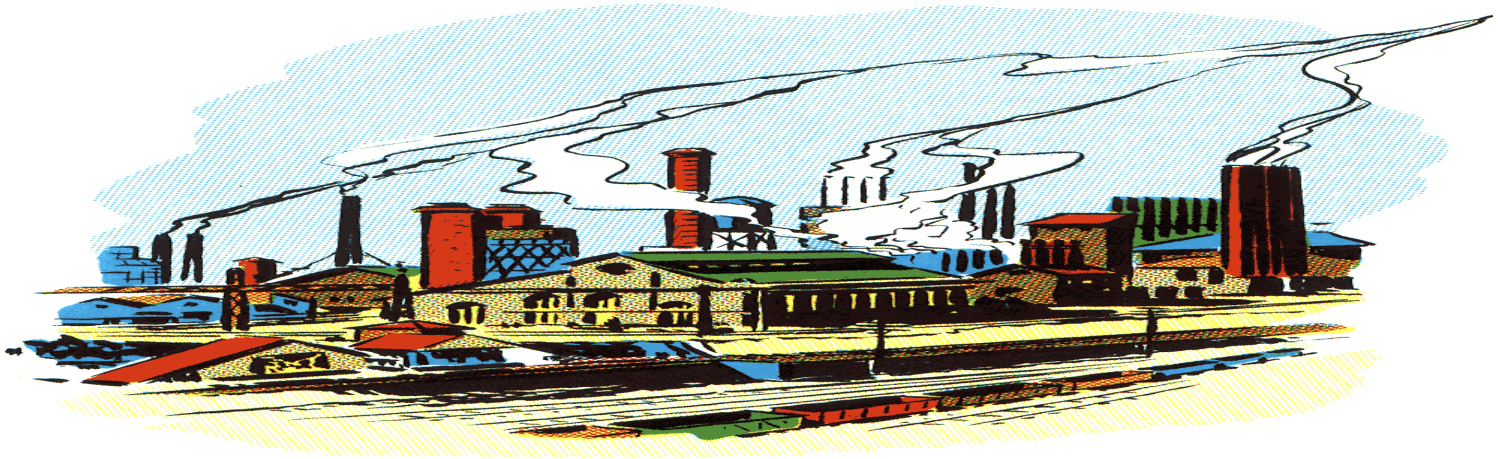
HAZARDS EVALUATION AND IDENTIFICATION

BY

MUHAMMAD KHALID YOUSUF
B. Pharm (Pak.), M.S. (Columbia Univ., USA)
R.Ph. (Ca, Fl, NJ, NY, USA), FACA (USA)

Plant Manager & Site Head
NOVARTIS PHARMA (PAKISTAN) LTD.
JAMSHORO, SINDH, PAKISTAN

e-mail: khalid.yousuf@novartis.com



At the beginning of this century it was held to be a sign of progress if Factory Chimneys smoked of OR at times the Air Stank Or Rivers flowed through the landscape in technicolor

IN PHARMACEUTICAL INDUSTRY FIRST SAFETY WAS LIMITED TO SECURITY GUARDS

THEN TO SAFETY OFFICERS OR SAFETY MANAGER

NOW THE WHOLE MANAGEMENT IS INVOLVED

BUT WHY?

SINCE PHARMACEUTICAL COMPANIES PERFORM THEIR ACTIVITIES ACCORDING TO GxP, SAFETY ASPECTS ARE MOSTLY COVERED. BUT WHEN COMPLEMENTED BY INCULCATION OF SAFETY CULTURE, IT RESULTS IN PREVENTING ACCIDENTS WHICH MIGHT HAVE CAUSED:

- **INJURY TO PERSONS**
- **HARM TO ENVIRONMENT**
- **DAMAGE TO PROPERTY**
- **LOSS OF GOODWILL**

PHARMACEUTICAL INDUSTRY

OLD CONCEPT

INPUT

MEN

MATERIAL

MACHINE

OUTPUT

PRODUCTIVITY

QUALITY

PRODUCT

PHARMACEUTICAL INDUSTRY
NEW CONCEPT

INPUT

MEN

MATERIAL

MACHINE

SAFETY

OUTPUT

PRODUCTIVITY

QUALITY

ACCIDENT FREE ATMOSPHERE

PRODUCT

IN ORDER TO MINIMIZE RISKS AND OCCUPATIONAL HAZARDS WE HAVE TO MANAGE RISKS AS FOLLOWS:

IDENTIFICATION OF HAZARDS

1. **SE DATA (PROPERTIES OF SUBSTANCES, OF INSTALLATIONS OF PROCESSES) LABORATORIES, DATA BASES, MSDS, SADA ETC.**
2. **EXPERTS FOR DATA COLLECTION AND INTERPRETATION.**
3. **SKILLED PROFESSIONAL PERSONNEL IN R & D, PLANT, SE ORGANIZATION**

EVALUATION OF HAZARDS

1. **TOOLS/METHODS (HA, HAZOP, PRORA)**
2. **EXPERTS / MODERATORS**
3. **GOOD KNOWLEDGE OF PROCESS CONDITIONS**

THESE TWO STEPS YIELD WHAT ONE MAY CALL AS KNOWLEDGE OF HAZARDS

BASED ON THIS WE USE ADDITIONAL TOOLS OF:
RISK PORTFOLIO
KEY FIGURES

RISK AND HAZARDS ARE PRESENT DURING

1. TRANSPORTATION
2. STORAGE / WAREHOUSING
3. DISPENSING / WEIGHING
4. MIXING
5. GRANULATING
6. GRINDING
7. DISSOLVING
8. HEATING
9. COMPRESSING
10. FILLING, ETC

THE HAZARDS COULD BE DUE TO

1. DUST EXPLOSION
2. TOXICITY
3. ELECTRICAL HAZARD
4. NON-USE / IMPROPER FUNCTIONING OF SAFETY GUARD / SAFETY PROTECTION
5. HARMFUL / HAZARDOUS MATERIAL
6. FIRE
7. CONTAMINATION
8. MIX-UP
9. COMPRESSED AIR
10. COMPRESSED GAS CYLINDERS
11. DEFECTIVE / AGING OF EQUIPMENTS
12. FLAMMABILITY
13. EXPLOSIVITY
14. HANDLING OF ACIDS / BASES ETC.

INDUSTRIAL HYGIENE RELATED FACTORS

CHEMICAL FACTORS

EXPOSURE TO SUBSTANCES

PHYSICAL FACTORS

NOISE, ULTRASONIC EMISSIONS
MECHANICAL VIBRATIONS / SHOCKS
ELECTRIC, MAGNETIC FIELDS & WAVES
UV-VISIBLE, INFRARED LIGHT, LASERS
COLD-AND HEAT STRESS IONIZING RADIATION

ERGONOMIC FACTORS

LIFTING, CARRYING OF LOADS WORKING POSTURE
STRANINING (REPETITIVE) MOVEMENTS WORKPLACE ARRANGEMENT, TOOLS, GRIPS AMBIENT CONDITIONS (LIGHT, TEMPERATURE, AERATION)

	Hazard Analysis (ZHA)	HAZOP	PRORA
Area of application	Generally applicable	Technical installations	Manufacturing processes
Starting point	Critical aspect	Hazardous deviation	Hazardous property of a component or mixture
Procedure	Team work with focus on whole scope	Team work with focus on detail	-overview on risks -list of risk reduction and/or control measures
Reporting provided	-list of hazards -list of potential accident situation -overview on risks -prioritized list of risk reduction and/or control measures	-list of potential accident situations -lit of risk reduction and/or control measures	
Requirements	Team size : 3 to 6 Duration: 10 to 30 hours	Team Size: 3 to 6 Duration: 12 to 40 hours	

RISK REDUCTION / RISK CONTROL

1. ENGINEERS (PROCESS, RISK)
2. KNOWLEDGE OF STATE OF THE ART TECHNOLOGY
3. TRAINING / INFORMATION AT ALL LEVELS

EMERGENCY PLANNING

1. EMERGENCY DRILLS / INFORMATION
2. EMERGENCY SERVICES (FIRE BRIGADE, AMBULANCE)
3. EMERGENCY MANAGEMENT PLAN
4. MITIGATOIN MEASURES (E.G. RETENTION BASINS)

BASED ON ABOVE FOUR STEPS FOLLOWING MANAGEMENT TOOLS ARE USED

1. HSE ORGANIZATION
2. INFORMATION / TRAINING / EDUCATION OF PERSONNEL AT ALL LEVELS
3. HSE AUDITS, WITH EMPHASIS ON IDENTIFICATION AND ELIMINATION OF HAZARDS
4. HSE COMMUNICATION

THANK YOU