



Lab Risk Factors and Control Tactics

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Importance of the Lab Safety

- Employee health and life
- Engaged in complication and risks
- Environmental protection
- Possible resulting in social infection

Sources of Risk

- Chemical hazards
- Electrical hazards
- Biochemical hazards
- Environmental hazards
- Staff
- Procedure

Risk Factors

- Combustibility
- Explosion
- Toxicity
- Electricity
- Biochemical
- Waste disposal
- Physical
- Staff
- Others

Combustion

● Chemicals

- ✓ Organic chemical: acetone
- ✓ Combustive gas: hydrogen, ethyne
- ✓ Radio chemicals: P, Na

● Working environment:

- ✓ Direct or indirect heater for sample preparation
- ✓ Temperature control in equipment analysis

● Electrical troubles during equipment operation

Explosion

- Special chemicals: TNT
- Volatile organic reagents: diethylether
- Cylinders
- Possible explosion during operations:
 - ✓ Sealed reaction system
 - ✓ Violent and high risk reaction
 - ✓ Reaction with pressure change

Toxicity

- Chemicals
- Operation procedures

Chemical Toxicity

● Corrosiveness:

- ✓ Strong acid and alkaline
- ✓ volatile acid: TFA
- ✓ Oxidation reaction: H_2O_2 ,

● Acute toxicity

- ✓ Toxicity reagents: $HgCl_2$, NaCN,
- ✓ Toxicity chemical standard: pesticides, drugs, PSP,

● Chronic toxicity

- ✓ Volatile, unsensible chemicals: acid, organic reagents, as methanol, acetonitrile

Toxic Chemicals in Operation Procedure

- Reaction to produce new toxic materials
- Direct use huge toxic chemical reagents, as CHCl_3 , during sample preparation
- Technical procedure to produce huge toxic gas during sample preparation: stable liquid becomes vapor.
- Waste from analysis equipments
- Toxicity intercross in the public environmental lab, especial in sample preparation.

Electronic Hazards

- Equipment failure
- Repair and maintenance
- Removable equipment and extension cords
- Electronic power troubles: Over load, grounding, Creepage etc
- Over night working

Biochemical Hazards

● Bloodborne Pathogen Exposure

- ✓ Collection
- ✓ Transportation
- ✓ Handle over and receipt
- ✓ Sample preparation phase
- ✓ Cross -contaminated or shared equipment
- ✓ Disposal procedure

Waste Disposal

- Disposal chemicals, including incompatibleness, reaction, instability,
- Damage to the lab, as acid corrupt, volatility
- Special storing or destroying procedure
- Avoiding the infectious contamination
- Safe disposal of biochemical sample, as decontamination

Physical Hazards

- Safety of heavy objects, like cylinders, including transportation, securing, usage
- Special working environment: cold traps, under pressure and bottled gases, radiation, microwave etc
- Special materials: glassware, knife, needle etc

Staff

- Characteristic and habit
- Mood
- Experience
- Working load

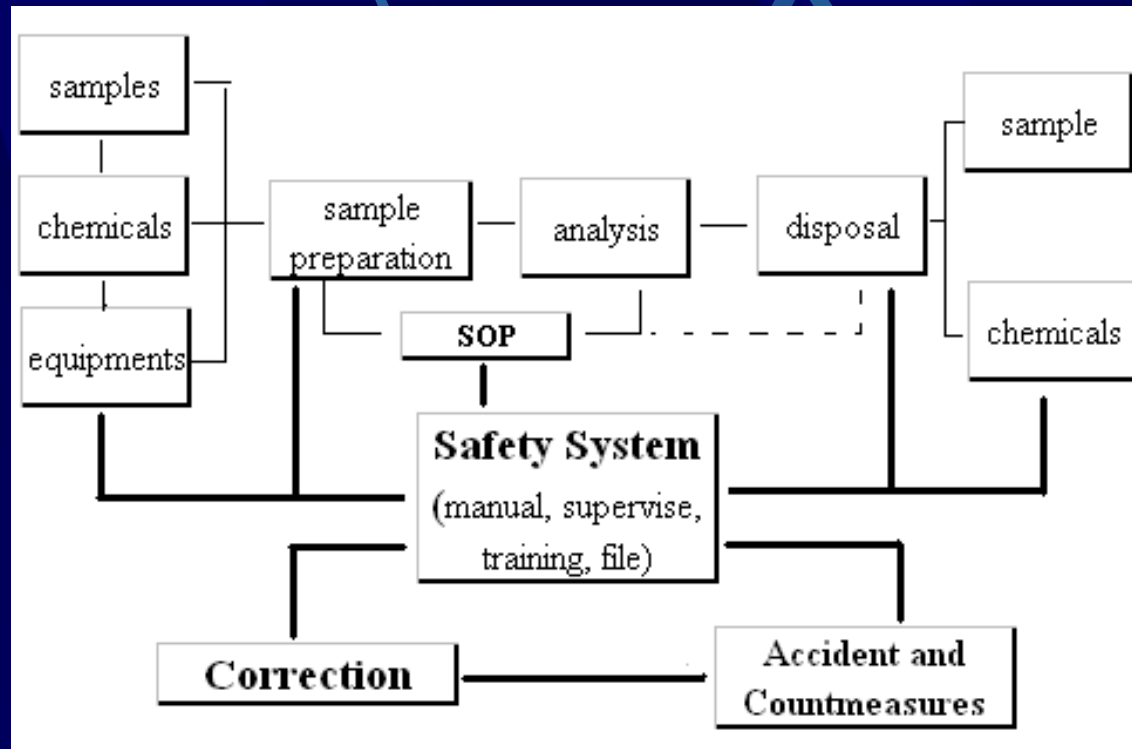
Others

- Radiation analysis
- Spill and leak
- Housekeep
- Standard operation procedure

Control Tactics

- Evaluate the possible risk factors in the special lab
- According the evaluation, set up the health and safety system, including manual, device, evaluation, supervise, training, file,

Lab Safety System



Control Tactics

- Harmony the relationships among individual, groups, public and working environment
- More attention to biochemical hazards
- Enhance the continuous training and evaluation
- Periodical evaluation of the management efficiency of lab safety and correction
- Necessary countermeasures against accidents, including first aid, evacuation, procedures etc

Thank you