

The present and the future:-

HAZARDOUS AREAS

Presented by :
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What Constitutes A Hazardous Area?

Hazardous Areas are a combination of these factors occurring simultaneously:

- Availability of air;
- Availability of flammable material;
- Source of Ignition:
 - Electrical;
 - Non-Electrical

Identification of Hazardous Area (Parameters)

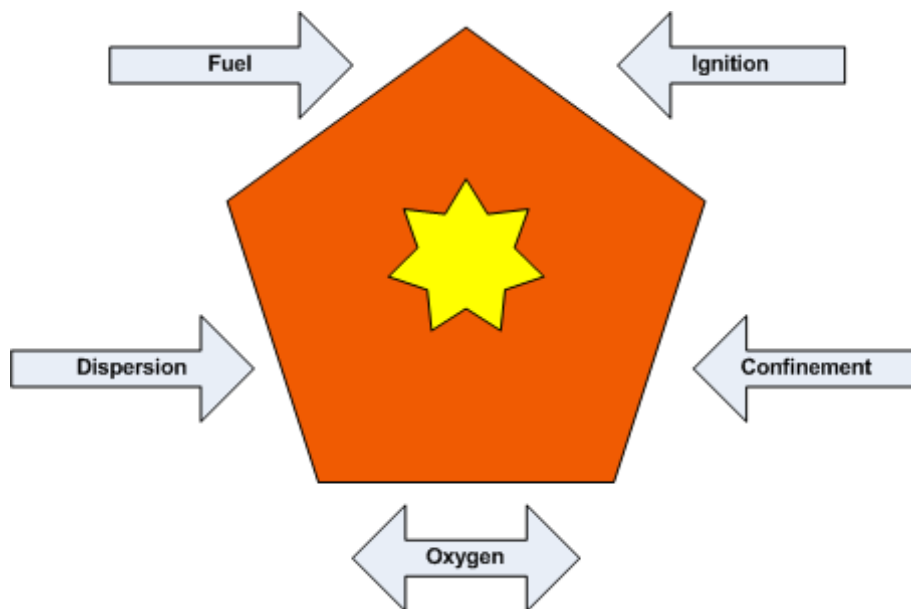
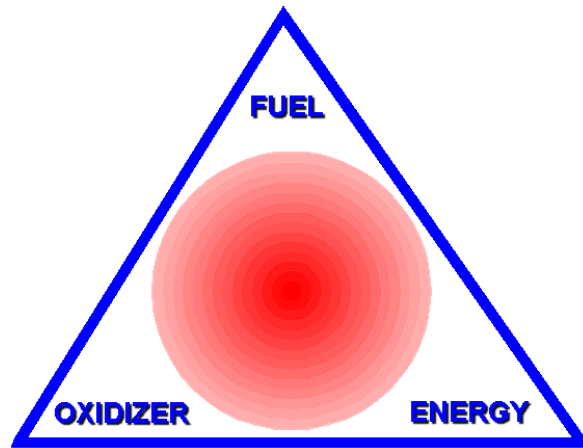
When you have identified a hazardous area you need to apply the following as the base concepts for safety (Note This is the International Language that you may note that they all require the same safe outcomes):

- Due diligence;
- Duty of care;
- All practicable steps.

Area Classification

- Based on Probability not consequence;
 - Outcome Area Zoning:
 - Petrochemical hazardous areas are split into Zones 0, 1, 2 and Non Hazardous[NH] by application of the standard, (Refer to AS/NZS 60079-10-1);
 - Non Hazardous often determined by Negligible extent NE
 - Dust hazardous areas are split into Zones 20, 21 and 22 (Refer to AS/NZS 60079-10-2)
- (Note: Remember that Risk involves probability of occurrence and consequence)

Identifying How To Control a Hazardous Area



Control of Energy (Ignition):

- Identify Source of Ignition:
 - Heat
 - Sparks;
- Eliminate the energy source that causes the ignition;
- Use equipment that controls the Ignition source (Engineering Techniques).
- Remove flammable product and replace with non flammable product

Four Main Considerations that have to be considered

- Elimination;
- Isolation;
- Condition of Control (Management Process)
- Engineering protection Techniques

Ventilation

- There should be plenty of fresh air where flammable liquids or gases are stored and used? Good ventilation will mean that any vapours given off from a spill, leak, or release from any process, will be rapidly dispersed.
- Large areas with small release volumes may not create a hazardous area.

Ignition

- Have all the obvious ignition sources been removed from the storage and handling areas? Ignition sources can be very varied and they include sparks from electrical equipment or welding and cutting tools, hot surfaces, open flames from heating equipment, smoking materials , static producing clothing etc.

Containment

Containment

- Are your flammable substances kept in suitable containers?

Exchange

- Can you exchange a flammable substance for a less flammable or non-flammable one?

Management Techniques and Processes (Conditions of Control)

Electrical apparatus should, as far as is reasonably practicable, be located in non-hazardous areas. Where it is not possible to do this, it should be located in the least hazardous area practicable.

Preventive measures aimed at the elimination of the risk of a simultaneous occurrence of a source of ignition and an explosive atmosphere in the area under consideration may be used.

Management Techniques and Processes (Conditions of Control)

The approach that must be taken in to account when managing the risks and processes involved shall be:

- **Step One** – Suppression or avoidance (Elimination) of the hazardous condition;
- **Step Two** – The isolation of the hazardous conditions;
- **Step Three** – The Conditions of Control and Procedures to deal with the hazardous condition;
- **Step Four** – The use of Explosion-protected equipment or a combination of the above.

Who is Responsible for the Safety of the Installation

The OWNER of the installation is ultimately responsible for its safety which includes the area classification, electrical, environmental and occupational safety and health issues.

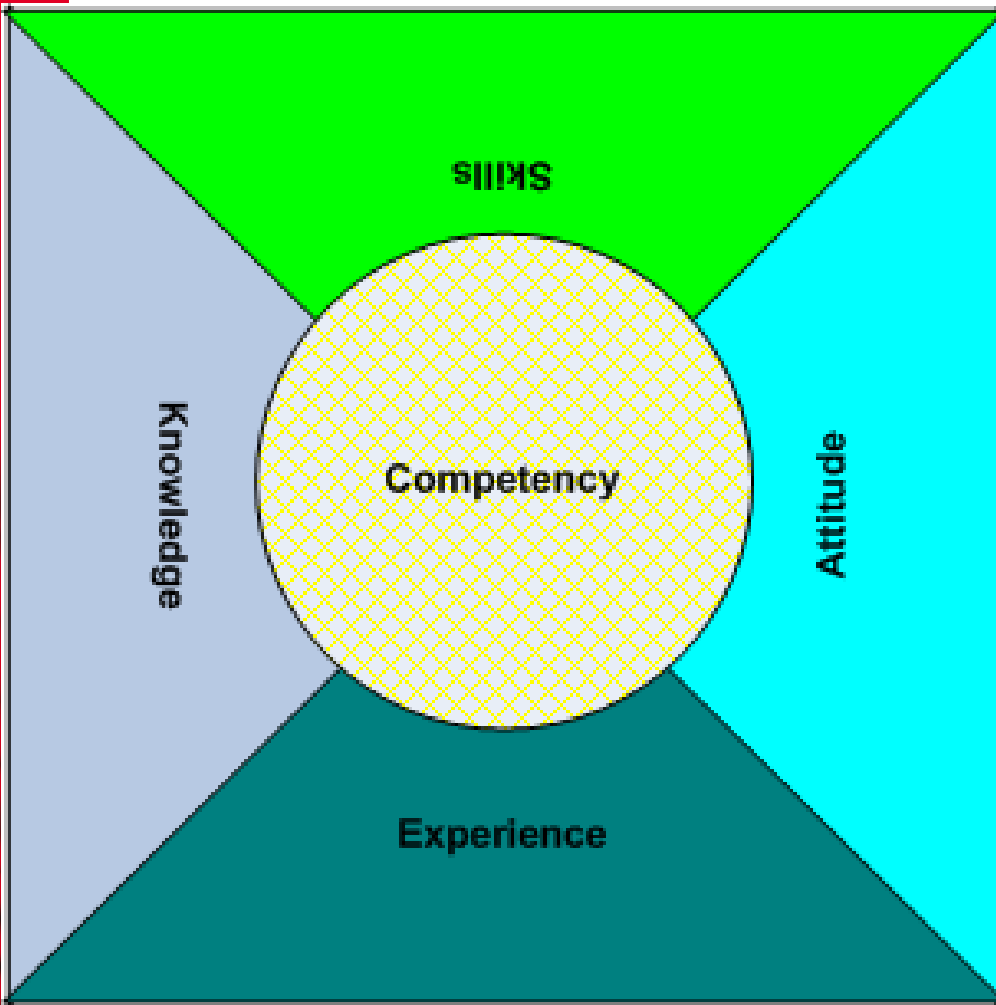
Most owners do not have all the expertise they require to hire the skills they need to deal with these issues.



Examples to work through:

- 1) Pit in Garage used to service diesel or petrol or both types of powered vehicles;
- 2) Bulk Bags of Flour in a bakery and where they are processed;
- 3) Engine Test Cell used by Aviation Industry.
- 4) Flange Joint in Gas Pipe located at unmanned pump station rarely visited by persons.
- 5) Paint Tint & Mixing Room;
- 6) Dangerous Goods Store.
- 7) Use of Gas Vapor Meters.
- 8) Hazardous Areas in confined spaces.

Competency



- Competency is the combination of **Knowledge, Skills, Experience and Attitude** which are the tools that enable someone to carryout the task **Safely, Effectively, Audit ably Compliant and Efficiently.**

Qualifications of Personnel -

Competency

- NZ Unit Standards developed under AS/NZS 4760:
- **CORE ELECTRICAL**
- **Level 4**
- 5930 – Demonstrate knowledge of electrical equipment for use in hazardous areas;
- 5929 – Demonstrate knowledge of hazardous areas and their electrical requirements;
- 5933 – Install and maintain electrical equipment in hazardous areas

Qualifications of Personnel - Competency

- **Level 5 NZ Unit Standards developed under AS/NZS 4760:**
- **ELECTRICAL EQUIPMENT IN HAZARDOUS AREAS**
- **Level 3**
- 17054 – Report on the integrity of explosion-protected electrical equipment in hazardous areas
- **Level 5**
- 17059 – Attend to breakdowns of electrical equipment in hazardous areas
- 17071 – Design electrical installations in hazardous areas
- 17055 – Ensure the safety of hazardous areas
- 17075 – Inspect in detail electrical installations in hazardous areas
- 17074 – Inspect visually existing electrical installations in hazardous areas
- 17056 – Install explosion-protected electrical equipment and wiring systems in hazardous areas
- 17058 – Maintain electrical equipment in hazardous areas
- 17073 – Test electrical installations in hazardous areas
- **Level 6**
- 17069 – Classify hazardous areas
- 17072 – Design explosion-protected electrical systems for hazardous areas

Qualifications of Personnel - Competency

- Level 5 NZ Unit Standards developed under AS/NZS 4760:
- PETROCHEMICAL OPERATIONS COMMUNICATION AND RESPONSES
- Level 4
- 9605 – Identify key responsibilities involving electrical equipment in petrochemical hazardous areas (this unit standard is expiring and no longer for sale)
- SAFETY AND LEGISLATION FOR ENERGY AND CHEMICAL PLANT
- Level 2
- 3067 – Operate personnel safety systems applying to hazardous areas in an energy and chemical environment;

Qualifications of Personnel - Competency

- Training Providers covering the Unit
Standards known at time of presentation:
- Western Institute of Technology (WITT)
in New Plymouth;
 - There are also various Training Providers
in Australia.

Area Classification

- The aim of **Area Classification** is to identify possible sources of release of hazardous vapours or dust under **normal operating conditions**.



The Petrobas P-36 oil rig in 1999
being carried by a special cargo
ship in the Guanabara Bay

(AFP PHOTO)



(AP PHOTO)

Petrobras P36 Oil Rig, off coast of Brazil

- Reported that nine people were killed following three explosions that ripped through the rig off the coast of Rio de Janeiro
- the **\$350 million** platform, the world's largest in terms of capacity, sunk.
- Blue-chip Petrobras stock tumbled, at the time immediately following the explosion
- Petrobras said it was poised to **lose \$50 million a month** with the rig out of operation.
- Total Losses mounted to:
 - **US\$515 000 000.00**



(AP PHOTO)



(AFP PHOTO)



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Hazardous Areas & HSNO

- Part 4 of the Hazardous Substances Classes 1-5 Controls Regs 2001 addresses the controls on classes 2, 3 and 4 hazardous substances.

Hazardous Areas & HSNO

- It is not a Test Certifier function to delineate hazardous areas.

Ex Equipment in Hazardous Areas

- The installation of suitably rated Ex electrical equipment in hazardous areas is determined by The Electricity Act and Regulations.
- Ex protection Techniques
- Exd, ExE, Exi, ExV, Extd(dusts) are just but a few examples of Hazardous area engineering.
- The Energy Safety Service is the administering agency.

Documentation

- The importance of an up to date Dossier / File

Periodic Re-inspections

- Hazardous area installations are required to be periodically re-inspected.

EPL's

- Equipment Protection Levels

Non Electrical Ignition Sources

- Introduced into Standards

...Brief Summary of a large and detailed subject

HAZARDOUS AREAS

Thanks

Garry House EnviroLight International