
Combustible Dusts

What do I do???

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The Past!

In the beginning:

- ❖ No standards
- ❖ No verification of apparatus
- ❖ No verification of installations

The Past!

Then came the standards!

- ✦ Originals were based on British Standards
- ✦ Created our own mix of:
 - ❖ British
 - ❖ European
 - ❖ North America
 - ❖ Then Australia & New Zealand developed their own
- ✦ Now Australia/New Zealand have completed the adoption of IEC

Where to start?

For industries where Combustible Dusts are being handled then the best place to start is with the new Code of Practice.

AS/NZS 4745:2004

“Code of practice for handling combustible dusts”

Code of Practice

Dust1

Code of Practice

This Code of Practice is intended to:

“to assist those industries which may have risks associated with the presence of combustible dusts as part of their processes, in minimizing the risk of injury, death or loss of property to fire and/or explosion through the application of good design and management principles and practices in the construction, operation and maintenance of manufacturing and processing plants and associated transportation and storage systems”.

Code of Practice

It covers:

- ❖ Philosophy
- ❖ Hazard Assessment
- ❖ Safety Requirements
- ❖ Determining the Presence of Effective Ignition Sources
- ❖ Plant Design
- ❖ Detailed Design & Operational Issues
- ❖ Emergency Management

Missing?

- ❖ Where is the assessment of the material?
- ❖ How do we know we have a combustible material?

Code of Practice

To put our subject matter today into perspective it is a part of Detailed Design and Operational Issues and includes:

- ❖ Classification of Hazardous Areas
- ❖ Design and Construction of Equipment, Protective Systems and components based on the avoidance of Ignition Sources

Materials

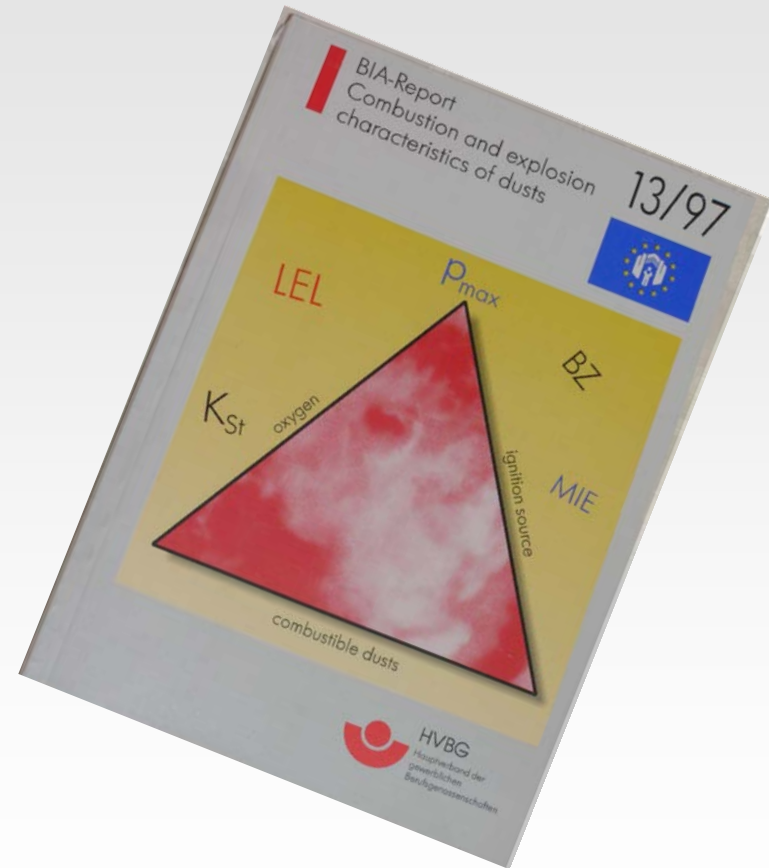
Material characteristics will vary:

- ❖ according to particle size and shape
- ❖ according to moisture content
- ❖ grain may depend on geographical location
- ❖ should be tested but reliable information may be sought but must be used carefully.

Materials

Material Data sources:

- ❖ NFPA 499
- ❖ BIA Report.



Process conditions

- ✦ Is the material being process or just stored?
- ✦ What temperature
- ✦ What pressures
- ✦ Contained
- ✦ Potential for static

Process example

✦ Blasting

- ❖ What material
 - ❖ Sand
 - ❖ Metal
- ❖ Particles released from the surface

Classification

OLD

- ❖ Class II (Australia)
- ❖ Zones 11 & 12 (New Zealand)

NEW

- ❖ 3 Zones are now introduced
- ❖ Only part of risk assessment
not THE risk assessment

Classification

Before dealing with Zones the separation of Dust Clouds and Dust Layers must be understood.

- ❖ Dust clouds explode.
- ❖ Dust layers generally burn
- ❖ Dust layers can be a source of a dust cloud.

Classification

What constitutes a dust layer?



Classification

Zone 20

Zone 21

Zone 22

Housekeeping

Classification

Material characteristics required for the selection of equipment

- ❖ Dust cloud ignition temperature
- ❖ Dust layer ignition temperature
- ❖ Ignition energy of dust cloud
- ❖ Thermal conductivity
- ❖ Electrical conductivity
- ❖ Introduction of Group III

Classification

Situations not covered by the classification standard:

- ❖ Mining
- ❖ Explosives
- ❖ Hybrid mixtures
- ❖ Catastrophic failure
- ❖ Flammable or toxic gas from the dust

Equipment

Protection techniques suitable for dusts:

- ✦ Ex t Protection by Enclosure
- ✦ Ex p Protection by Pressurization
- ✦ Ex i Intrinsic Safety
- ✦ Ex m Protection by Encapsulation

Selection

Selection according to:

- ✦ Area classification
- ✦ Protection Technique
- ✦ Surface Temperature
- ✦ Conductive or non-conductive dust

Selection

★ Temperature margin for Dust
Clouds

2/3^{rds}

★ Temperature margins for Dust
Layers

50K

Inspection & maintenance

All inspection and maintenance requirements that apply to Combustible Dusts have transferred from AS 2381.1 to AS/NZS 61241.14/17 and finally to AS/NZS 60079.14/17

Effectively there is no change!

Summary

Australia and New Zealand are the first to adopted the IEC standards for Dusts. The major changes are in place and with the 3 zones users can better apply the risk assessment including apparatus selection.

The fine tuning has occurred at a rapid rate and we have reached a point of stability where industry can get on with applying these standards with confidence.

Aim to avoid !!!



THE END

