



A Dust Hazard Analysis or DHA is a structure review technique to identify the hazards due to the operation and handling of combustible dust. The DHA is led by an experienced facilitator and performed by diverse operational disciplines to identify the hazards present when handling combustible dust.

Different standards of the National Fire Protection Association (NFPA) and the International Fire Code (IFC) requires performing a DHA. Additionally, it is a critical element of the risk management of the operations as it represents the Hazard Identification and Risk Analysis (HIRA) of the CCPS Risk-Based Process Safety (RBPS).

WHEN IS IT PERFORMED?

There are several moments when a DHA is needed:

- In a Project to
 - identify the hazards present by the operations and identify features and modifications required to reduce the associated dust risk
 - Design fire protection systems and measures that adequately to control the fire and explosion risk
- When considering a change. Any change has the potential to introduce new hazards or modify the design intention of an implemented fire protection feature. For that reason, the change requires the realization of Management of Change (MOC). A Combustible Dust review is performed during the MOC process to identify the introduction of new hazards or if the change impacts the fire safety philosophy of the facility requiring modifying the existing fire protection system ensuring an adequate fire & explosion risk control
- During Operations to ensure that the fire protection philosophy, risk controls, and design systems are effective in controlling the fire & explosion risk of combustible dust.
- After an incident has occurred, to evaluate if prevention measures were adequate and verify that system performed as expected.

HOW IS IT DONE?

There are diverse DHA methods. The DHA is performed in a workshop with appropriate functional disciplines and lead by a facilitator. The most appropriate method should be selected for the study objective, scope, and context. In Surety Consultants, we use our expertise to help the client select the most appropriate methodology for the context.

The most used DHA methods include:

- Checklist from NFPA Standards (e.g., NFPA 654, NFPA 652, NFPA 664, NFPA 484, NFPA 61, NFPA 64)
- HAZID
- Hazardous and Operability (HAZOP)
- Failure Mode & Effect Analysis (FMEA)

These techniques are aligned with the methodology defined in the *CCPS's Guidelines for Combustible Dust Hazard Analysis*.

WHAT IS NEEDED TO PERFORM A DHA?

Due to the criticality of the DHA, performing the study requires appropriate information.

The information required for properly manage the process safety hazards is known as Process Safety Information (PSI). Adequate PSI should be available and accurate for the DHA. Additionally, the risk management rules need to be known, and the right people need to be in the room.

PROCESS SAFETY INFORMATION (PSI)	DIVERSE FUNCTIONAL DISCIPLINE REPRESENTATIVES
<ol style="list-style-type: none"> 1. Process System Diagram and Drawings (e.g., Piping and Instrumentation Diagrams (P&ID), Process Flow Diagrams (PFD) or block diagrams) 2. Process and Procedure Descriptions 3. Process Equipment Specifications 4. Characterization of the Combustible Dust (St 1, St 2, or St 3) 5. Alarms and Instruments set point and information 6. Process Operational limits 7. Plot plans and general arrangement drawings 8. Specification and basis of the design of existing fire protection systems 	<ol style="list-style-type: none"> 1. DHA Facilitator 2. Process Engineering 3. Instrumentation or Automation Engineering 4. Operations 5. Mechanical Engineer 6. Health & Safety or Process Safety
RISK MANAGEMENT FRAMEWORK	EQUIPMENT
<ol style="list-style-type: none"> 1. Risk Matrix 2. Risk Tolerability Criteria 	<ol style="list-style-type: none"> 1. Computer with agreed DHA software 2. Projector to project the DHA worksheets, so the documentation is observed by the team member 3. Snacks and drinks

HOW IS IT DOCUMENTED?

An essential step in preparing for a DHA is selecting software that can document the discussion, the hazards, the resolutions, the safeguards implemented, and any action or recommendation. Many software packages are available, each with its advantages and limitations. A Microsoft Excel-based package is an excellent standard software choice for many teams.

This software is databases that allow capturing the information in table form. Regardless of the method used, the process to be analyzed is sub-divided into sections, known as nodes, and for each section, different questions are asked to promote brainstorm. The responses of the questions are recorded in a table. See below an example of the table.

CAUSE	CONSEQUENCE	SEVERITY	LIKELIHOOD	RISK	SAFEGUARDS	ACTIONS
Blower overrun	Increase temperature on the Hopper to dust thermal degradation causing an ignition an internal Dust Hopper Explosion	High	Unlikely	Medium	1) AIT-001 Shutdown blower when the temperature in Hopper reach 75% of Dust thermal degradation	1) Verify Dust thermal decomposition temperature to ensure a proper set point

GET IN TOUCH

We are to help you achieve operational excellence.

Houston, USA

+1 979 402 1174

Santiago, Chile

+56 9 7222 0336

info@suretyc.com

www.suretyc.com