

CIDM 3350:70/Database System Design: FA 2023: Abraham Sen, Ph.D.

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Project Deliverable 1

1.a Chosen Area:

EHS (Environment, Health, and Safety) in a Warehouse Storage Facility.

- Inaccurate Tracking of Employee Training (Inability to Keep Employees Up to Date)
- Inaccurate Incident Reporting (Inability to Analyze Incident Cause; Potential Legal Consequences/Fines)
- Inaccurate Equipment Inspection Tracking

Project Deliverable 2

1.b Data Management Problems:

Data mismanagement in a warehouse storage facility's EHS department can cause serious problems, including accidents and legal troubles. Mismanagement can make it hard to understand what is happening in the workplace and prevent good safety decisions.

Data is often scattered all over an organization. An example is poor tracking of employee training: the organization is unaware of employees' training being outdated, which can endanger employees. Many companies work out of spreadsheets requiring time-consuming manual data entry. This introduces inaccurate reporting, data entry errors, lack of data standardization across departments, duplicated data, and makes it harder to share data. This can result in failure to report accidents, difficulty in analyzing incidents, and an inability to identify risks.

A centralized database and reporting system would track employees, their departments and supervisors, the training that employees are expected to complete and their completion timestamp and expiration date, equipment inspections, and any incidents along with their date, incident type, severity, description, employee(s) involved, supervisor on duty, equipment involved, root cause, and impact (death/injury, property damage, environmental damage).

1.c Motivation:

The motivation for the EHS database and reporting system is to ensure that employees are up to date on training that equipment is being inspected, and to enable incident root cause analysis. Then the warehouse can reduce risks, ensure employee safety, and avoid lawsuits and/or fines. It will reduce manual data entry, reduce data errors, standardize data, and enable easy sharing of data for analysis.

1.d Potential Benefits:

The potential benefits of the EHS database and reporting system are: that supervisors will have more time to analyze incidents, determine if further training is needed for particular employees or departments, and will be better equipped to make data-driven decisions to prevent future incidents. Efficiency will increase as they can retrieve information faster and reduce 'paperwork hunting'. By having employees up to date on training, they will comply with company policies and improve employee safety (possibly even saving lives).

1.e Potential Users:

The EHS database and reporting system is designed to be used by various professionals, including safety officers, managers, safety training personnel, and supervisors. The database will enhance safety and regulatory compliance, give insights into the impact of safety incidents on the business, and guide efforts to reduce incidents.

2 - Business Rules:

CKM Warehouse Storage Facility

1- Department:

- A department has attributes Department_ID (Identifier) and Department_Name. A department can have multiple employees in it.

2- Employee:

- Every employee must belong to only one department. There are four subtypes for employees: supervisors, forklift operators, equipment inspectors, and inventory clerks. All of the employees share the following attributes. Employee_ID (Identifier), Name, Address, City/State/Zip, and Phone_Number. Only supervisors have training certifications.

3- Incident:

- Incidents may not happen all the time, but when they do, we need to track Incident_Report_ID (Identifier), Employee_Involved_ID, Type, Occurrence_Date, Description, Severity, Supervisor_On_Duty_ID, Root_Cause, Impact, and Equipment_Involved_ID. Multiple employees can be involved in an incident and an employee can be involved in multiple incidents. Up to one supervisor is on duty during an incident. Incidents do not have to have a employee recorded, a un-attended machine could roll out or a equipment could explode. It also doesnt not have to involve an equipment, it could be a dispute.

4-Safety Inspection:

- Attributes include Inspection_ID and also has an Inspector_ID, Equipment_ID, and Inspection_Date. Each inspection is performed by one qualified employee on a specific piece of equipment at a given date and time. Multiple inspections cannot be performed on the same equipment at the same time.

5- Employee Training:

- Employee training has an identifier Training_ID and attributes Supervisor_ID, Employee_ID, Training_Name, Completion_Timestamp, and Expiration_Timestamp. Training is provided by an employee who is in the EHS department. Employees can do multiple training sessions.

6-Equipment:

- Equipment has the following attributes: Equipment_ID, Equipment_Name, Last_Inspected_Date. Inspectors can inspect multiple pieces of equipment. A piece of equipment can be inspected multiple times over time.

EER Model

