**PROJECT**

**Henderson Construction Company Case Project**

**PART 1**

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**Executive Summary**

**Objective**

The objective of this document is to identify the major challenges Henderson Construction Company is facing and come up with a simple and working database solution for their needs.

**Problem Summary**

Henderson Construction Company is growing and expanding, therefore facing new opportunities and challenges. Based off the information provided, we think the most pressing problem Henderson is facing are Payroll Management and Inventory Tracking.

**Payroll**

Some of the reasons why we think their Payroll Management system is a major challenge is due to several issues including:

* The payroll is run manual every time.
* It involves complex calculations to derive the checks (difficult to see a direct correlation between hours and pay for each worker)
* The payroll is run by a single person as of now along with other administrative activities.
* Generating any reports from the data for Indiana Equal Employment Opportunity Commission (EEOC) Compliance is very difficult and a concern. Failure to show the data would make Henderson stripped of its qualification, making it ineligible to bid on state contracts.
* No data points to prove for, some of the workers were asking questions about their paychecks, suggesting that they were perhaps being shorted hours.

**Inventory**

Another problem Henderson is going through is with the Inventory or Machinery & tools involved in their work:

* Not able to track where the tools & machinery are on a given day.
* No tracking of the maintenance information of the machinery.
* Lack of control on their maintenance lead to unnecessary fines and complains.

**Proposed Design & Solution**

The growing problems need a definite solution in a better way. Henderson was a small business and doesn’t need a complex structure in place. We recommend creating a Software System with Employee Payroll and Inventory Control functions. The proposed Software System should use a Database to store and maintain the data.

As it is a small group of people, it will be easy for us to understand and create a model by identifying and breaking issues into multiple relations and storing the related attributes to track the data. As a first step a small relational database setup is the right solution for their needs. It helps them store the data in a normalized way. 2nd step will be to create a front-end application to store and read the data which can help them interact with the database to generate the reports and store the data in the model created. This will reduce the workload on Mary and help her generate paychecks easily. Mary can also pull the Compliance report Bi-weekly for EEOC which can help them stay in business. Patrick who was having issues in tracking the machinery can now keep track of the inventory and their maintenance records, so they have clear report of each of their machinery and their maintenance track which can help them to be in compliance with OSHA guidelines.

**Need of a Database System**

A file based data management systems contains multiple files that were stored in many different locations. Because of this, there can be multiple copies of the same file which lead to data redundancy. It can also cause data modification problems and anomalies. A database will solve these issues and helps to keep track of things in a proper manner.

Database store data in tables in which each table has data about a different type of thing called entities. It also stores data and relationships among the data. Redundancy problem can be removed by data normalization techniques. Databases enables data sharing, security, faster data access and improved decision making which would help Henderson business to meet their current pressing business needs.

**Initial Database Design – A conceptual Model**

We designed the data model required for Henderson’s business application as given below:

* Payroll System Tables

The Payroll system should have functionalities to capture employee/worker details, skill sets, the project assignment, timecards and calculate salary per pay period. It also should have function to calculate net salary after deducting the federal and state taxes. Other functionalities include generating bi-weekly report for Equal Employment Opportunity Commission (EEOC) and make sure the Company complies with the EEOC guidelines.

**Expected Table List:**

PROJECT (ProjectId, ProjectDescription, SiteName, IsStateProject)

PROJECTROLE (EmployeeId, ProjectId, Role)

EMPLOYEE (EmployeeId, LastName, FirstName, EmailId, DateOfBirth, Ethnicity, Gender, SSN)

ADDRESS (AddressId, AddressLine, City, Zip)

STATE (StateId, Name, Abbreviation)

STATETAX (StateTaxId, SalaryRange, Percentage, MaxDeduction)

FEDERALTAX (FederalTaxId, SalaryRange, Percentage, MaxDeduction)

JOBTYPE (JobTypeId, JobDescription, SkillClassification, StatePayRate, NonStatePayRate)

TIMESHEET (TimeSheetId, Date, HoursWorked)

PAYCHECK (PaycheckId, PayDate, TotalSalary, FederalTax, StateTax, NetSalary)

PAYPERIOD (PayPeriodId, Name, StartDate, EndDate)

EEOREPORT (ReportLineId, TotalWages)

EEOCLASSIFICATION (EEOClassificationId, Name, Description)

* Inventory System Tables

The Inventory Control System should have functionality to capture the Inventory Items, their maintenance schedules and location tracking.

**Expected Table List:**

PROJECT (ProjectId, ProjectDescription, SiteName, IsStateProject)

INVENTORYITEM (ItemId, PurchaseDate, ItemCondition)

MAINTENANCE (MaintenanceId, LastMaintenanceDate, NextMaintenanceDate, Status, Remarks)

INVENTORYTRACKING (TrackingId, Date, ItemLocation)

ITEMCATEGORY (ItemCategoryId, ItemName, Description, Make, Model, HandlingInstructions)

SUPPLIER (SupplierId, SupplierName)

ADDRESS (AddressId, AddressLine, City, Zip)

**Assumptions**:

Below are few assumptions while creating the Conceptual model to solve both the primary issues.

**Payroll**

* We need to have an intersection (join) table in between Project and Employee to find the role a worker plays (Ex: An employee can be a Supervisor and also can be working as a Carpenter).
* Between Project and job there will be many to many relationships.
* Timesheet need to have 1:N relationship with Employee, Project, Job & PayCheck
* PayCheck will have 1:N relationship with Employee & PayPeriod
* EEOReport need to have 1:N relationship with EEOClassification, PayPeriod, Project & Job to generate the Compliance report every bi-weekly for EEOC.

**Inventory**

* Project to Inventory Tracking will be N:M relationship as the item can be in any of the location and can be used in multiple projects.
* InventoryItem will have a 1:N relationship with Maintenance.
* ItemCategory will have a 1:N relationship with InventoryItem.