# Construction projects Profit and KPI Analysis

**Objective:**

As a Construction Project Manager and Construction Technology Enthusiast, my primary objective in this analysis was to ascertain the profitability and key performance indicators (KPIs) for construction projects. My aim was to Automate & leverage these insights to facilitate informed decision-making and deepen the understanding of each project's financial dynamics. The motivation for this endeavor stemmed from the need to transition away from manual, timeconsuming,and error-prone methods, which often led to delayed and inaccurate financial reports.

**Data Collection:**

**Payment Requisition (Schedule of Values):** This involves analyzing contract amounts, change orders, and the total work completed & billed to assess project profitability accurately. Data is sourced from Textura for projects managed within this platform, and manually from Google Sheets for others.

**Labor Costs:** Labor hours are tracked via the FingerCheck application, with data retrieved using its API.

**Material Costs:** Costs are tracked through QuickBooks, with data exported as a CSV file.

**Change Order Log:** An internal Google Sheets log records all pending change orders, crucial for financial projections.

**Data Integration and Analysis:**

- Power BI is used for visualizing the financial analysis, providing insights into project profitability and KPIs.
- Python Notebook runs weekly with updated data to maintain current financial information, merging data from various sources for a comprehensive analysis.

**Steps:**

**Labor Analysis:**
- API keys are set as environment variables for security.
- Data from FingerCheck is retrieved for specified date ranges, focusing on labor hours and rates.
- Data is cleaned and filtered to include relevant columns only.

- Labor costs are calculated by merging labor hours with rate information, adjusting for weekends and specific positions.

**Material Analysis:**
- Material costs are loaded from a QuickBooks CSV file.
- Data is cleaned and filtered to focus on transaction details relevant to project costs.

**Project Budget/Contract Amount:**
- Textura data is used to calculate contract amount, change orders, revised contract, total amount of work completed to date.
- Manual requisition data is integrated for projects not in Textura.
- The combined dataset provides a comprehensive view of the project budget.

**Merging Data:**
- Labor, material, and budget data are merged on a project basis.
- This integrated dataset forms the basis for profitability and KPI analysis.

**Analysis and Reporting:**
- Calculations include project completion percentage, labor and material costs of work completed, labor rates, Mason VS labor ratio, current profit, potential profit including pending change orders and others.

**Outcomes Achieved:**

- Automated Financial Reporting: Streamlined data collection and analysis process, reducing manual errors and time spent on financial reporting.
- Profitability and KPI Insights: Enhanced understanding of project financial health, including profitability, labor and material cost efficiencies, and potential impacts of change orders.
- Informed Decision-Making: The analysis supports strategic decision-making by providing timely and accurate financial insights.
- In the process streamlined to have the first name and last name of 200+ personals across various applications (finger check, payroll,...)
- Input labor wage hours (which were in a paper source before)
- Eliminated providing an manually entered information to payroll company, and started using reports generated by finger check application and directly fed to payroll company for hours and wages of employees. Which in turn reduced manual labor and errors.
- Project profits which were calculated manually at the end of year and to receive surprise losses, not more informed decisions are taken based on up to date profit analysis.
- Many more dashboards can be prepared based on the data available.

**Project Name**

Select project from drop down ⌄

| | |
|---|---|
| **16416** | **39.9** |
| M&F Hours | Avg M&F Rate |
| **29834** | **36.2** |
| L Hours | Avg L Rate |
| **46250** | **$37.6** |
| Total Hours | Ave Rate |
| **$1,728,459** | **28.23%** |
| Labor Cost | Labor Cost (%) |
| **$1,768,304** | **28.88%** |
| Material Cost | Material Cost (%) |

**$3,650,000**
Contract

**$2,535,374**
Change Orders

**$6,185,374**
New Contract

**98.99%**
Project Completed

**$6,122,874**
Billed to date/completed

**$612,287**
Insurance (10% of work com...

**$612,287**
Overhead (10% of work com...

**$311,123**
Workmen comp (18% of labor)

**$1,090,413.0**
Profit

**17.8%**
Profit %

**138601**
Unpaid CO's

**$1,229,014**
Potential Profit in...

**19.6%**
Potential Profit in...

# 1:1.82

M vs L Ratio