

Construction Projects Cost, Delay & Vendor Analysis

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1. Executive Summary

This report presents key insights from the Construction Projects dashboard, which consolidated data on cost overruns, delays, and vendor spend across all active and completed projects:

- **Total Budget Overrun:** \$4.81 M (16.98 % of \$28.31 M total budget)
 - **East region** contributes **35 %** of the overrun
 - **Project 34 (West)** is the single largest overrun at **\$490 K (68 %)**
- **Total Delay Days:** 549 days
 - **East** leads with **202 days**
 - **Weather** accounts for **232 days (42 % of all delays)**
- **Total Vendor Spend:** \$6.88 M
 - **Concrete** represents **40 %** of spend (\$2.74 M)
 - Top-spend vendors ratings:
 - Vendor 105: 4.9
 - Vendor 103: 4.2
 - Vendor 110: 3.9

Two of the top three vendors fall below a **4.5** rating, highlighting a need for cost and performance review. Based on these findings, we recommend an immediate **scope audit** for the highest-overrun projects, **region-specific risk mitigation** (especially East weather scheduling), and a **vendor performance review** focused on high-cost, lower-rated suppliers.

2. Data & Methodology

- **Data Sources:** MySQL tables ta_projects, ta_budgets, ta_delays, ta_vendors, and ta_project_vendors.
- **Transformations:** Created star-schema views for facts (vw_fact_budget, vw_fact_delay, fact_vendor_cost) and dimensions (projects, delay, vendors).

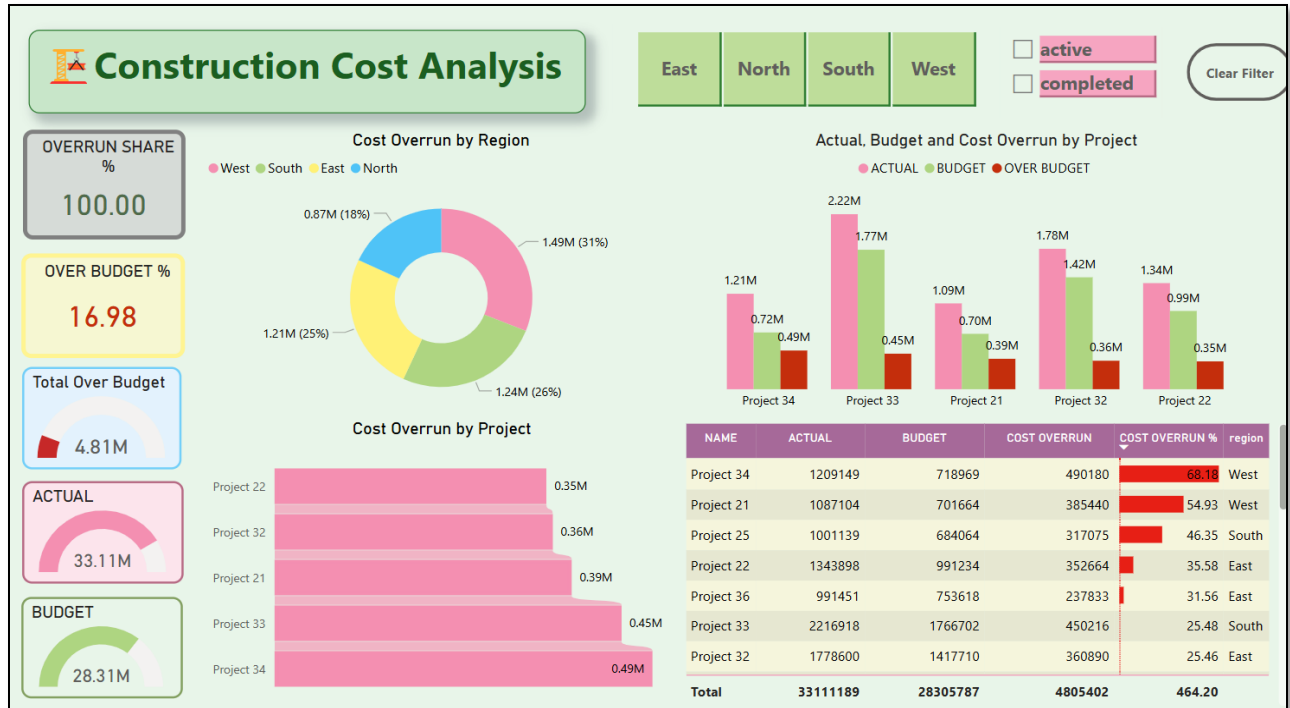
- **Tools:** Excel, SQL (MySQL), DAX measures in Power BI, and scheduled gateway refresh.
 - **Key Metrics:**
 - Cost Overrun Amount & %
 - Total Delay Days by Reason & Region
 - Vendor Spend by Category & Rating
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3. Analysis

3.1 Cost Overruns

Question: Where are we overrunning budget, and which projects carry the greatest risk?

- **Total Overrun:** \$4.81 M (16.98 % of \$28.31 M budget)
- **Regional Share: (see Figure 1 – Cost Overrun by Region):**
 - East: \$1.21 M (25 %)
 - South: \$1.24 M (26 %)
 - West: \$1.49 M (31 %)
 - North: \$0.87 M (18 %)
- **Project Spotlight:**
 - *Project 34 (West):* \$490 K overrun (68 %)
 - East has the highest count of over-budget projects, suggesting systemic estimation issues



Key Insight:

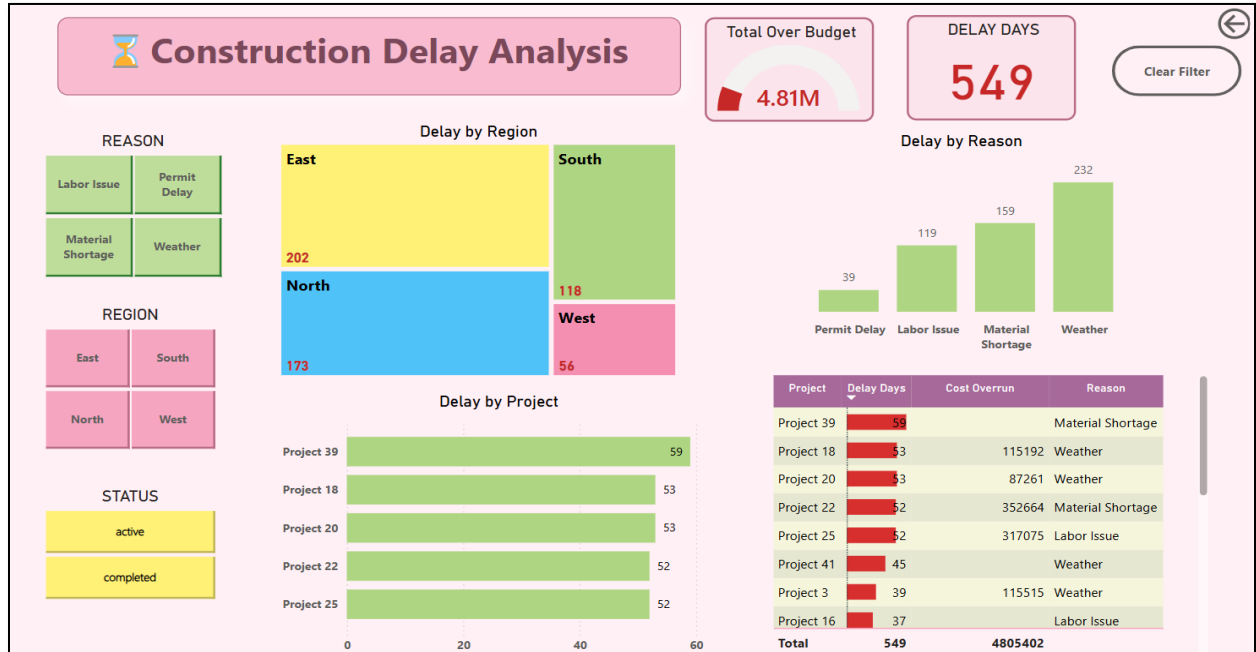
A combination of a few large overruns (e.g., Project 34) and many smaller overruns in the East region together drive significant P&L impact.

3.2 Schedule Delays

Question: How many delay days have accrued, where are they concentrated, and what are the main causes?

- **Total Delay Days: 549**
- **By Region (see Figure 2 – Delay Days by Region):**
 - East: 202 days
 - North: 173 days
 - South: 118 days
 - West: 56 days
- **By Cause (see Figure 3 – Delay Causes):**
 - Weather: 232 days (42 %)
 - Material Shortage: 159 days (29 %)
 - Labor Issues: 119 days (22 %)

- Permit Delays: 39 days (7 %)



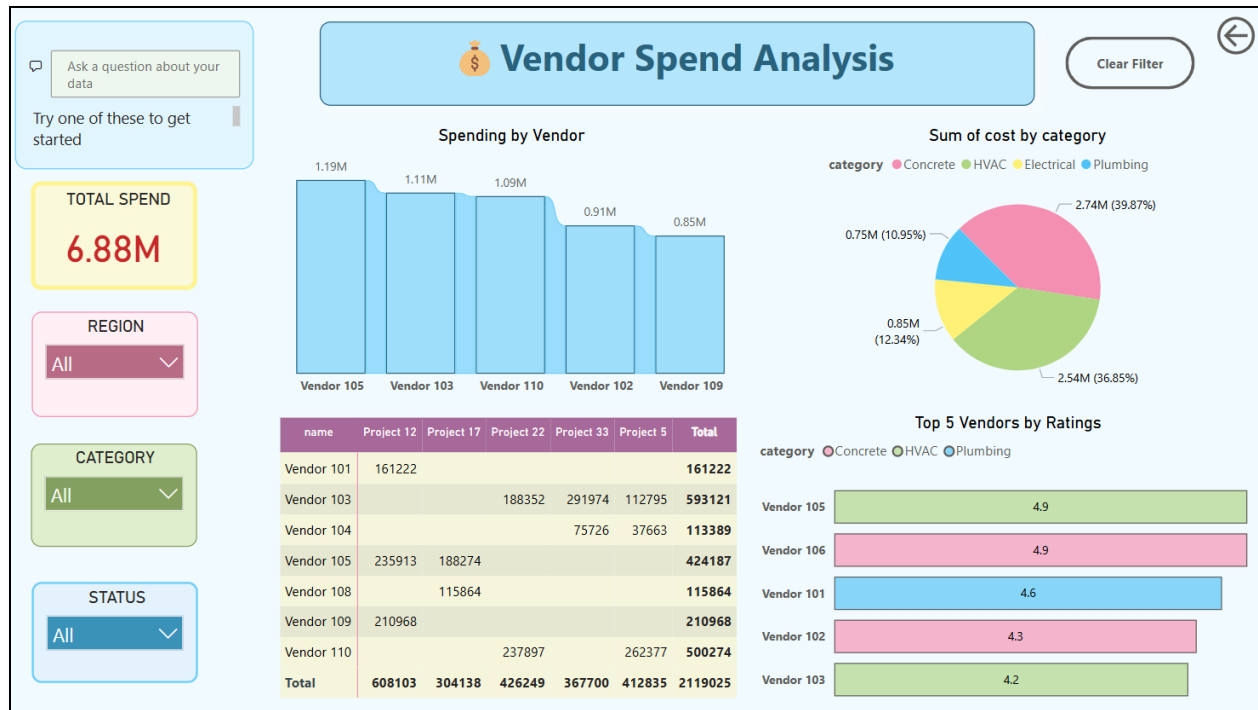
Key Insight:

The East region not only overruns most frequently but also suffers the greatest weather-related delays, pointing to the need for seasonal schedule adjustments.

3.3 Vendor Spend & Quality

Question: Are we achieving quality commensurate with vendor spend, especially in high-cost categories?

- **Total Spend:** \$6.88 M
- **Category Breakdown (see Figure 4 – Spend by Material):**
 - Concrete: \$2.74 M (40 %)
 - HVAC: \$2.54 M (37 %)
 - Electrical: \$0.85 M (12 %)
 - Plumbing: \$0.75 M (11 %)
- **Top Vendors by Spend & Rating:**
 - Vendor 105: \$1.19 M spend, Rating 4.9
 - Vendor 103: \$1.11 M spend, Rating 4.2
 - Vendor 110: \$1.09 M spend, Rating 3.9



Key Insight:

High spend on concrete is not matched by uniformly high ratings. Vendors 103 and 110—while major spenders—have ratings below 4.5, indicating a strategic procurement risk.

4. Conclusions & Discussion

- **Budget Control:** Tighten estimation and gating processes in the East region; deep-dive scope audits for outliers like Project 34 in the West.
- **Delay Mitigation:** Implement weather-adjusted scheduling and pre-secure alternate material suppliers specifically in the East.
- **Vendor Optimization:** Renegotiate or replace high-cost, lower-rated vendors; enforce a minimum 4.5 rating threshold for the preferred-vendor list.

Overall: By improving estimation accuracy, enhancing scheduling resilience, and raising vendor performance standards, we estimate a **10–15 % reduction in overruns and delays** over the next two quarters.

5. Next Steps

1. Configure Power BI Alerts:

- Overrun > \$5 M

- Delay > 600 days
- Vendor Spend > category thresholds

2. Automate Weekly Exec Snapshot:

- Schedule a Monday 8 AM email subscription of the live dashboard page.

3. Measure Impact:

- Re-run this analysis in Q3 and compare overrun %, total delay days, and vendor rating improvements.

6. Appendix

6.1 SQL & DAX References

Key SQL Views:

CREATE VIEW vw_fact_budget AS ...

CREATE VIEW vw_fact_delay AS ...

CREATE VIEW vw_fact_vendor_cost AS ...

```
CREATE OR REPLACE VIEW `construction_projects`.`vw_fact_delay` AS  
SELECT
```

```
  p.project_id    AS project_id,  
  d.delay_days    AS delay_days,  
  d.reason        AS reason
```

```
FROM
```

```
  `construction_projects`.`ta_projects` p  
JOIN `construction_projects`.`ta_delays` d  
  ON p.project_id = d.project_id;
```

```
CREATE OR REPLACE VIEW `construction_projects`.`vw_fact_budget` AS  
SELECT
```

```
  p.project_id          AS project_id,  
  b.estimated_cost      AS estimated_cost,  
  b.actual_cost         AS actual_cost,  
  (b.actual_cost - b.estimated_cost) AS cost_overrun_amount,  
  ROUND(((b.actual_cost - b.estimated_cost) * 100.0) / b.estimated_cost, 2)  
  AS cost_overrun_percent
```

```
FROM
```

```
  `construction_projects`.`ta_projects` p  
JOIN `construction_projects`.`ta_budgets` b  
  ON p.project_id = b.project_id;
```

```
⊖ CREATE TABLE `ta_vendors_cost` (  
  `project_id` int DEFAULT NULL,  
  `vendor_id` int DEFAULT NULL,  
  `cost` int DEFAULT NULL,  
  `material_type` text  
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_0900_ai_ci;
```

Core DAX Measures:

Total Over Budget =

```
SUMX(  
    FILTER(  
        fact_budget,  
        fact_budget[actual_cost] > fact_budget[estimated_cost]  
    ),  
    fact_budget[actual_cost] - fact_budget[estimated_cost]  
)
```

Share % =

```
DIVIDE(  
    SUM(fact_budget[actual_cost]) - SUM(fact_budget[estimated_cost]),  
    CALCULATE(  
        SUM(fact_budget[actual_cost]) - SUM(fact_budget[estimated_cost]),  
        ALL(projects[region])  
    ),  
    0  
) * 100
```

Overrun % (Over-Budget Only) =

```
DIVIDE(  
    SUMX(  
        FILTER(  
            fact_budget,  
            fact_budget[actual_cost] > fact_budget[estimated_cost]  
        ),  
        fact_budget[actual_cost] - fact_budget[estimated_cost]  
    ),  
    SUMX(  
        FILTER(  
            fact_budget,  
            fact_budget[actual_cost] > fact_budget[estimated_cost]  
        ),  
        fact_budget[estimated_cost]  
    ),  
    0  
) * 100
```