Safety Incident Analysis:
Impact of Checklist Completion and Key Factors

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Analysis of the Correlation Between Rain Day Flag and Weather Condition during Incidents

- **Analysis Process**
  - Extract data from the dataset to identify days where rain was recorded (WEATHER) and determine the corresponding incident dates (INCIDENT_DATE).
  - Cross-reference the data with the (RAIN_DAY_FLAG) column to check whether a heavy rain advisory flag was set on those dates.
- **Analysis Logic:**
  - Filter data to include only days with rainfall and identify rows where an incident occurred.
  - Analyze the presence or absence of the heavy rain advisory flag (RAIN_DAY_FLAG) to calculate the correlation between rainfall-related incidents and the presence of the advisory flag.
- **Results**
  - There is a noticeable trend where incidents on rainy days are more frequent depending on the absence of the advisory flag.
  - 26% of incidents during rainy days occurred when the heavy rain advisory flag was raised, while 74% occurred without the flag.
  - The presence of the advisory flag may indicate reduced incidents, suggesting its effectiveness in alerting people about the need for further refinement in raising flags.

Analysis of the Correlation Between Safety Checklist Completion and Safety Outcomes

- **Analysis Process**
  - Dataset Connection: Link the CHECKLISTS and SAFETY_INCIDENTS datasets through the JOB_CODE.

- **Analysis Logic:**
  - Calculate the checklist completion rate: Divide the number of submitted checklists by the expected number of submissions during the given period.
  - Analyze the correlation between the Safety Incident Rate and checklist completion rate.

- **Results**
  - Projects with higher checklist completion rates tend to have lower Safety Incident Rates.
  - Specifically, projects with higher completion rates for weekly checklists (Weekly Safety Meeting, Weekly Safety Inspection) experienced fewer major incidents (LTA).
  - According to the graph, checklist completed rate is 49.19% and No checklist complete rate is 54.81%

Analysis of Other Factors Strongly Correlated with Safety Incidents

- **Analysis progress:**
  - Connect with data sets:
    - Join SAFETY_INCIDENTS, DAILY_JOURNALS, JOB_CONTRACT, and VENDOR_APPROVAL_STATUS.
    - Merge the data based on date and JOB_CODE..
- **Analysis logic:**
  - Worker-to-space ratio: Calculate DJ_HEADCNT / JOB_BLDG_SF..
  - Weather factors: Add the impact of rain (precipitation, DJ_PERCIP) and strong winds (DJ_WINDSPEED).
  - Date factors: Analyze the day of the week on which accidents occur.
  - Subcontractor grade: Compare accident rates based on SAFETY_APPROVAL_STATUS.
- **Result:**
  - Worker-to-space ratio: Safety Incident Rate increases sharply when the number of workers per space exceeds a certain threshold.
  - Weather factors: Rainy days (DJ_PERCIP > 0) and strong winds (DJ_WINDSPEED > 15) are key factors that increase the accident rate.
  - Day-of-week factors: Accident rates are relatively higher on Mondays and Fridays.
  - Subcontractor grade: Projects using Vendor Rank 3 subcontractors have significantly higher LTA rates.

Visualization of Safety Incident Rate and LTA Rate

- **Analysis process:**
  - Visualizing two factors, Safety Incident Rate and LTA Rate based on two levels:
    - Project level: Comparison of Incident Rates by Project.
    - Entire company level: Understanding Overall Incident Rate Trends and Averages.
    - Used formula:

      SIR = (Number of Recordable Incidents * 200,000) / Total Hours Worked

      LTA = (Number of LTA * 200,000) / Total Hours Worked
- **Result:**
  - Identifying Projects with Higher Safety Incident Rates and LTA Rates Than the Average.
  - Checklist Incompletion Rates and Vendor Ratings are Identified as Key Causes in High-Risk Projects.

Dashboard

- **Visualization of the relationship between checklist completion and incident rate:**
  - Bar chart of checklist completion rate and Safety Incident Rate

- **The relationship between Weather and Incident Rate**:
  - A graph showing the relationship between weather (precipitation, wind speed) and incident rate.

- **Safety Metrics:**
  - Set Safety Incident Rate and LTA Rate as KPIs.

Thank you for listening