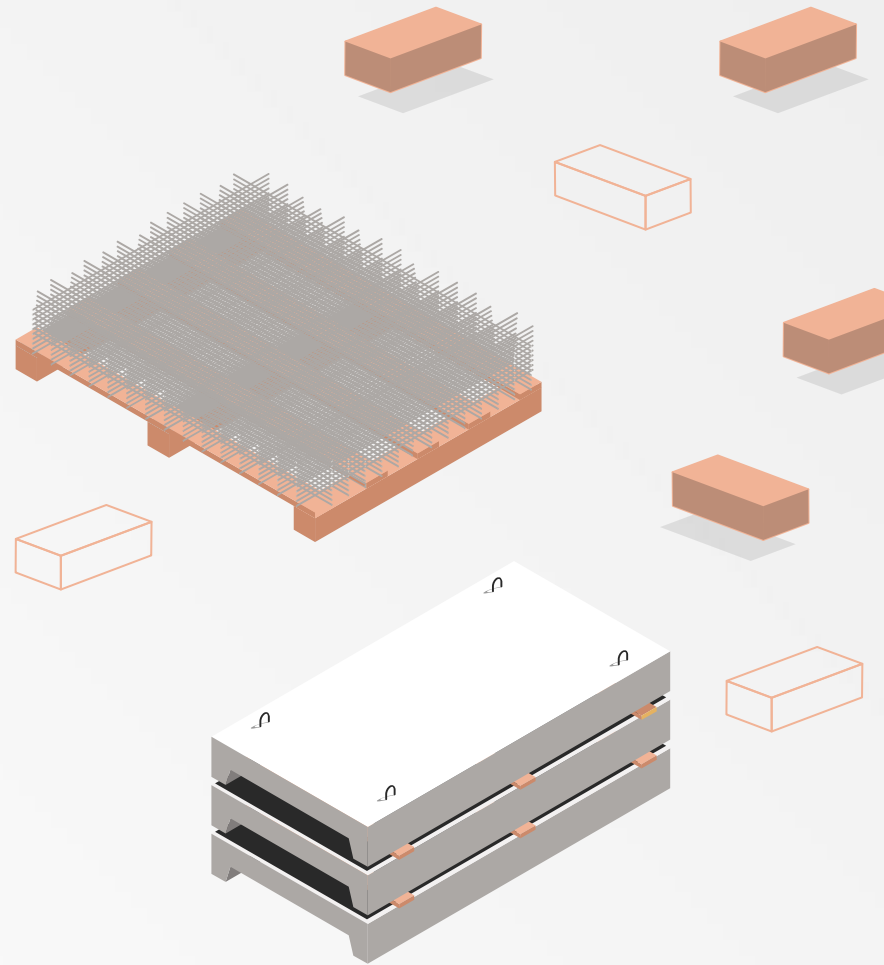# Data Analysis of Rainfall and Construction Demand in Singapore

Syahiran Rafi
DSI-SG-42
Project 1

Overview

01
Introduction

02
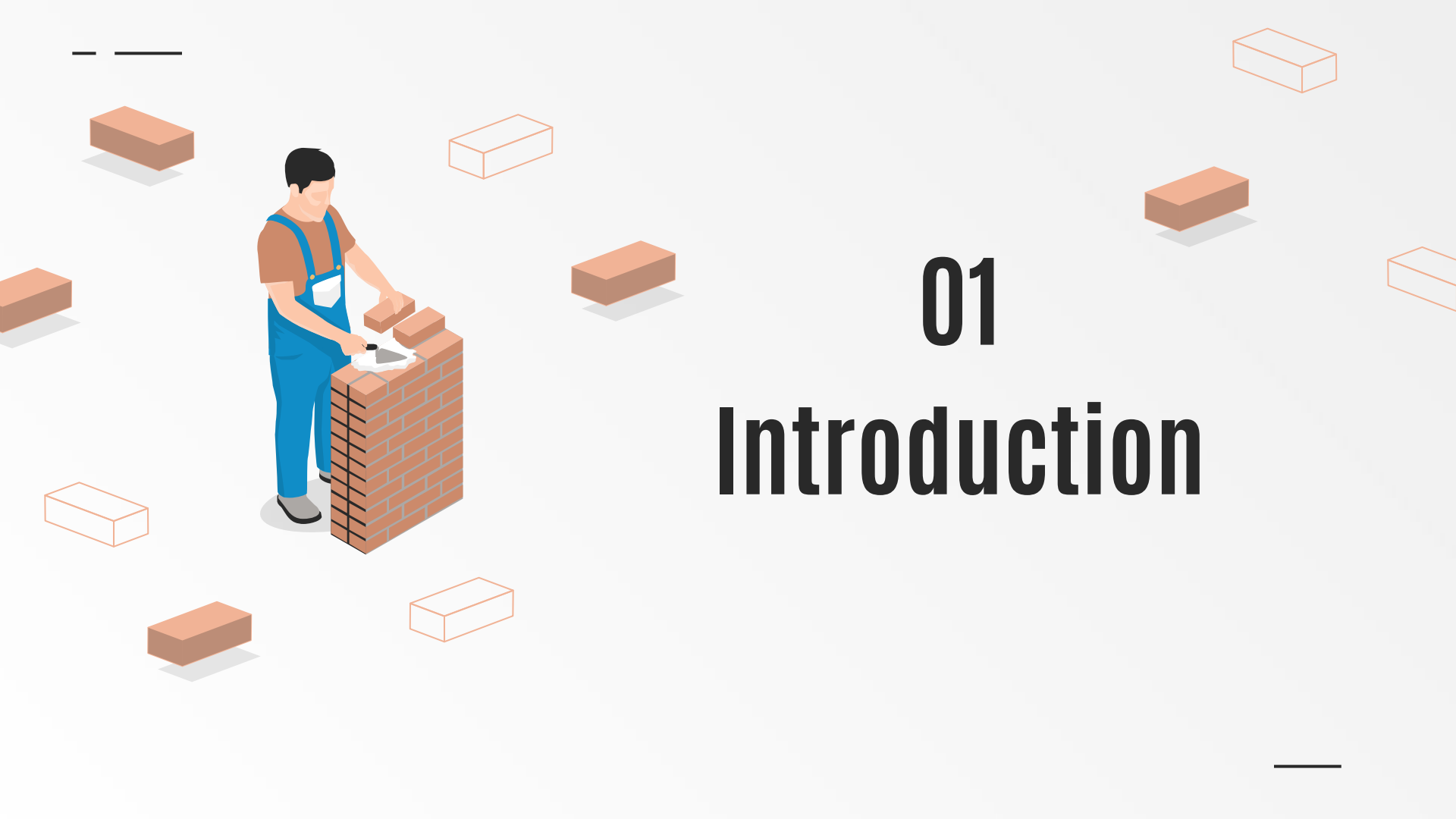**Problem Statement**

03
Key Statistics

04
Recommendations

01
Introduction

Demand for Construction Materials (Last Decade)

Demand for Cement, Concrete and Granite (2014 to 2023)

Demand for Construction Materials (Last Decade)

Demand for Cement, Concrete and Granite (2014 to 2023)

National Development Minister Desmond Lee speaking at the Built Environment and Property Prospects seminar on Jan 15 PHOTO: LIANHE ZAOBAO

Source: The Straits Times, Jan 2024

"An estimated $33.8 billion worth of contracts were awarded in 2023, **higher than the initial construction demand forecast** of between $27 billion and $32 billion."

$32b to $38b in construction contracts expected to be awarded in 2024: BCA

National Development Minister Desmond Lee speaking at the Built Environment and Property Prospects seminar on Jan 15 PHOTO: LIANHE ZAOBAO

Source: The Straits Times, Jan 2024

"An estimated $33.8 billion worth of contracts were awarded in 2023, **higher than the initial construction demand forecast** of between $27 billion and $32 billion."

## $32b to $38b in construction contracts expected to be awarded in 2024: BCA

National Development Minister Desmond Lee speaking at the Built Environment and Property Prospects seminar on Jan 15 PHOTO: LIANHE ZAOBAO

"From 2025 to 2028, the projected annual construction demand is expected to be **between $31 billion and $38 billion per year**"

Source: The Straits Times, Jan 2024

02
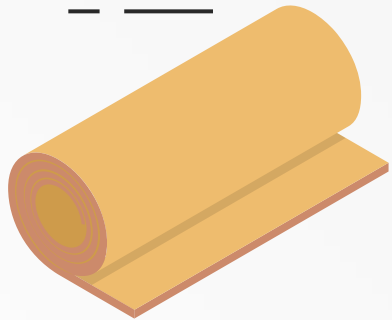# Problem Statement
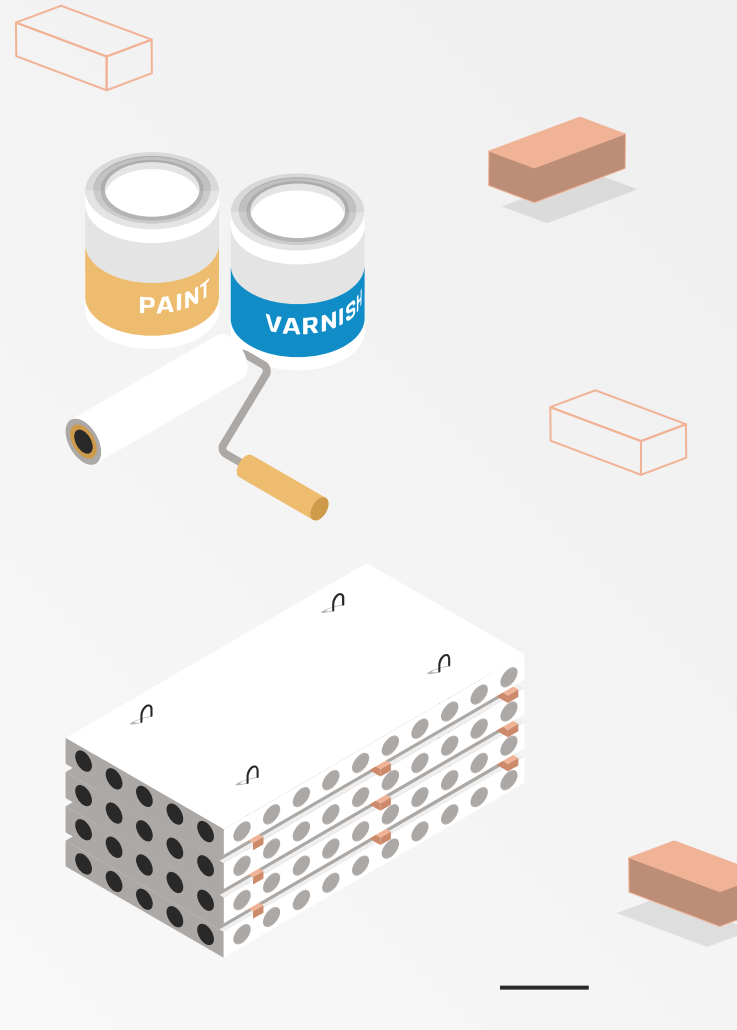
I'm a data analyst working for a company that produces construction materials. The demand for such materials in Singapore often fluctuate during the year. I aim to help my company analyse monthly weather patterns in Singapore to determine if it influences the demand for such materials. The objective is to allow the company to better plan its production capacity and make the necessary price adjustments to sustain demand throughout the year.
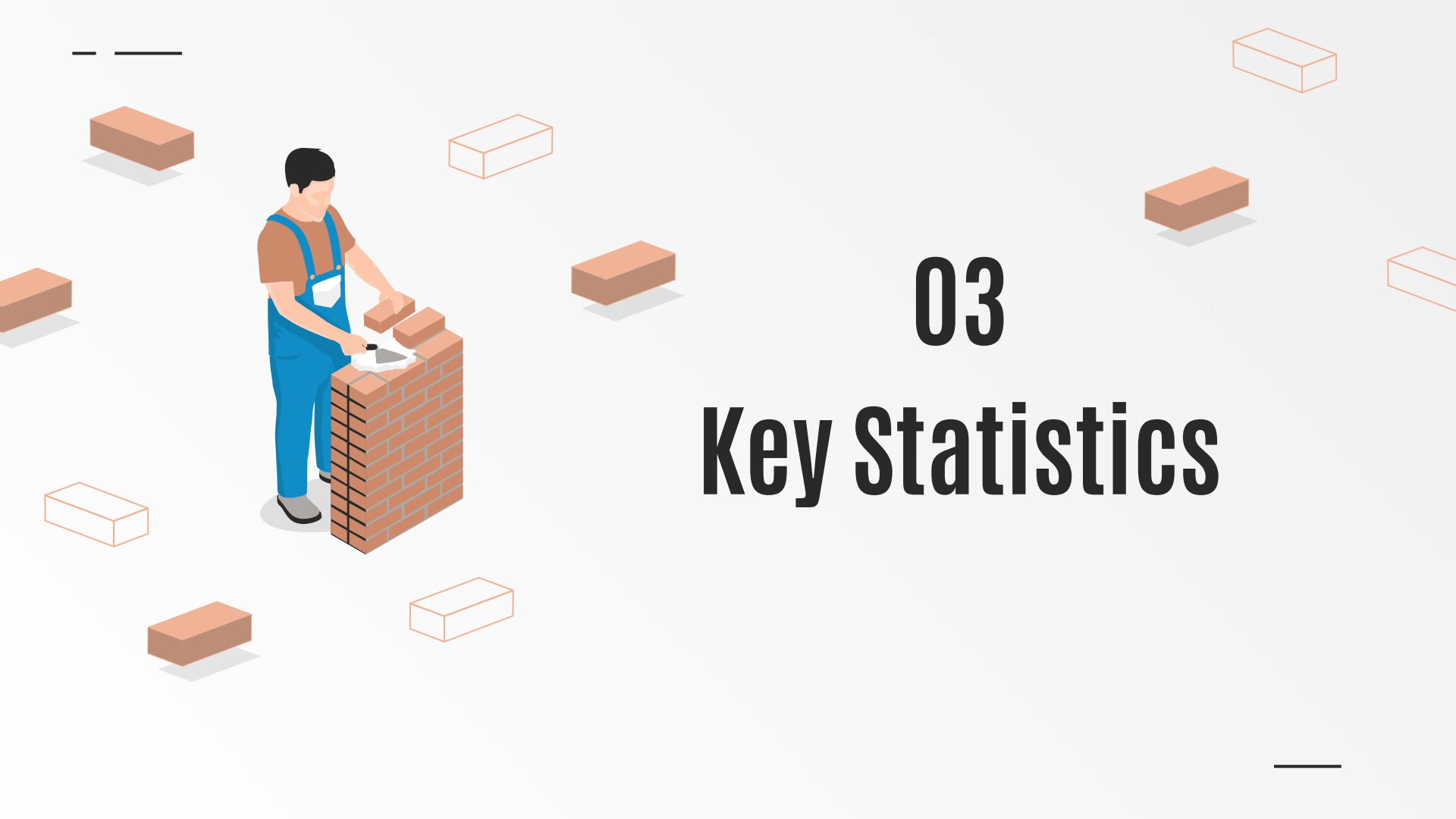
CONTEXT
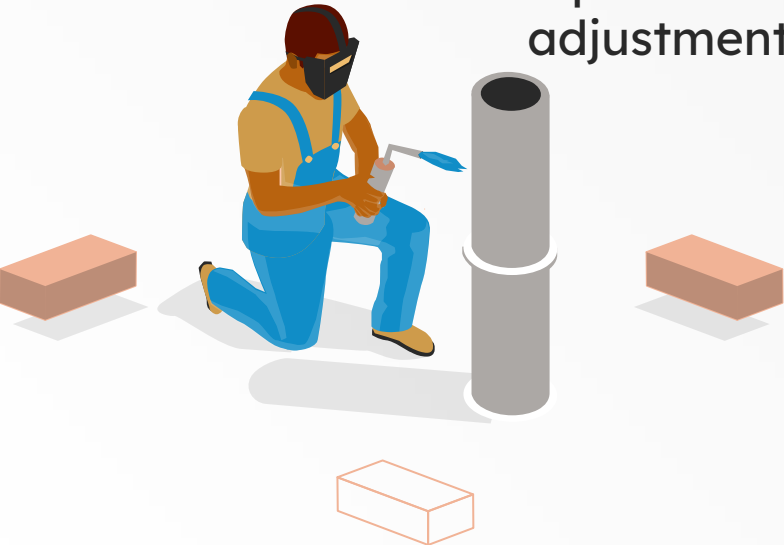
PROBLEM STATEMENT

Can we observe any clear relationships between Singapore's weather patterns and the demand for construction materials?

Let's dive into the key statistics...

03
Key Statistics

Demand for Construction Materials, 1999 to 2023

Cement 1

Steel reinforcement bars 2

Granite 3

Ready-mixed concrete 4

Weather Statistics, 1982 to 2022

Monthly Number of Rain Days

\> 0.2 mm daily

Monthly Total Rain Recorded

Measured in mm

Monthly Maximum Daily Rainfall

Measured in mm

Monthly Mean Sunshine Hours

Measured in hours
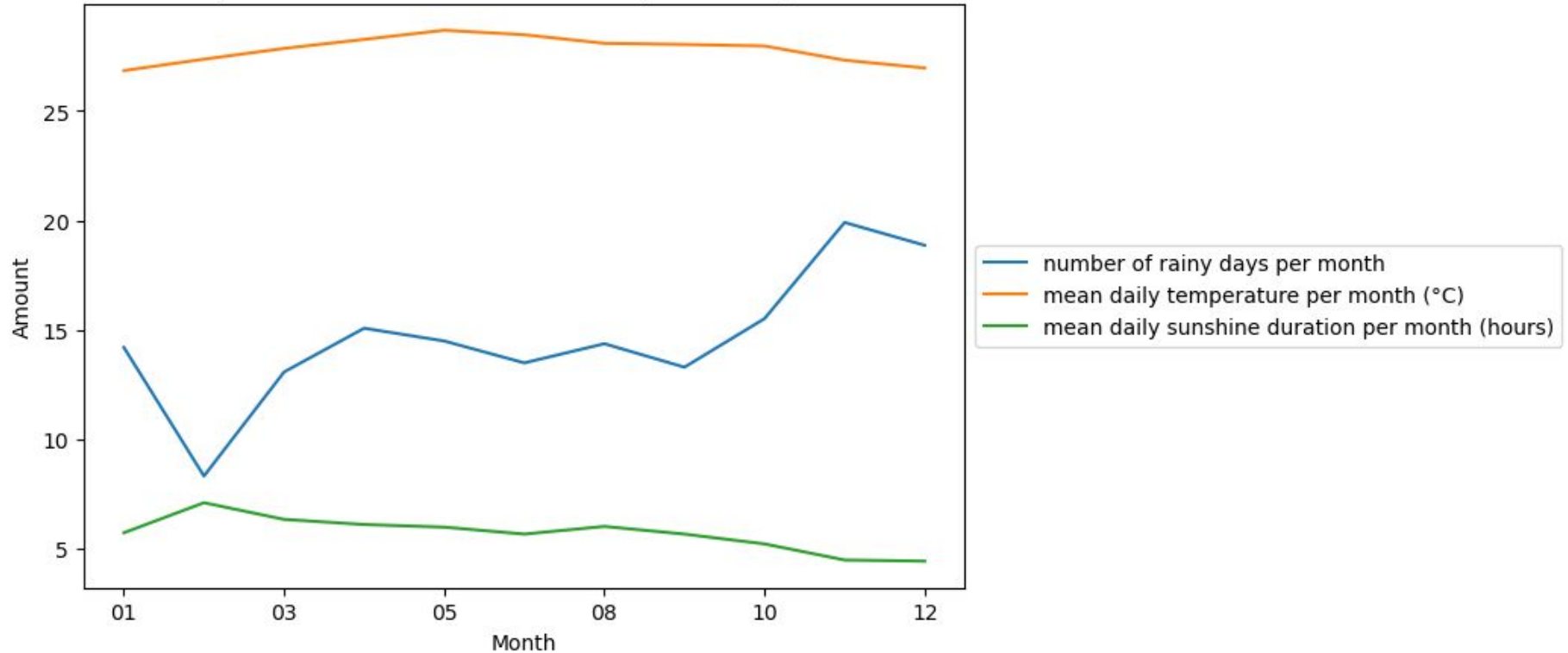
Mean Mean Temperature

Measured in °C

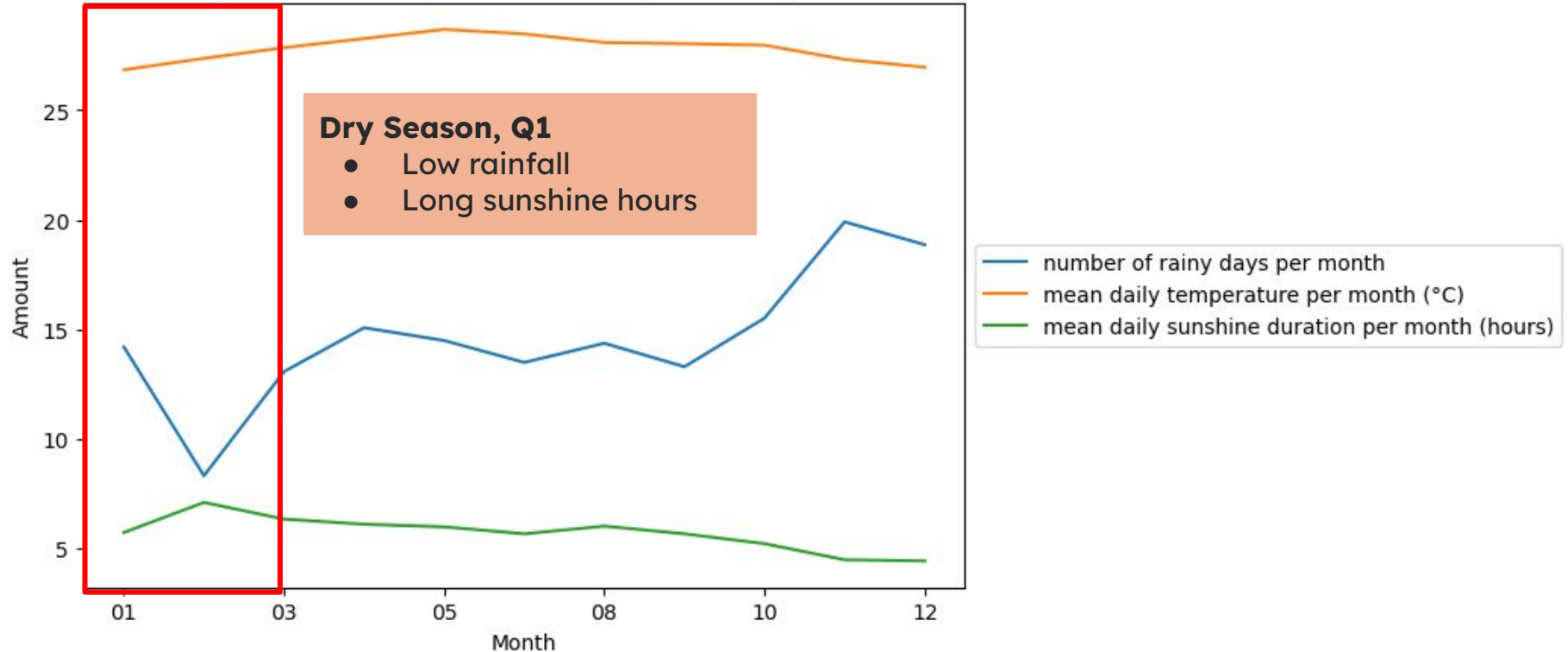**Monthly Mean Relative Humidity**

Measured in %

Monthly Weather Trends in Singapore

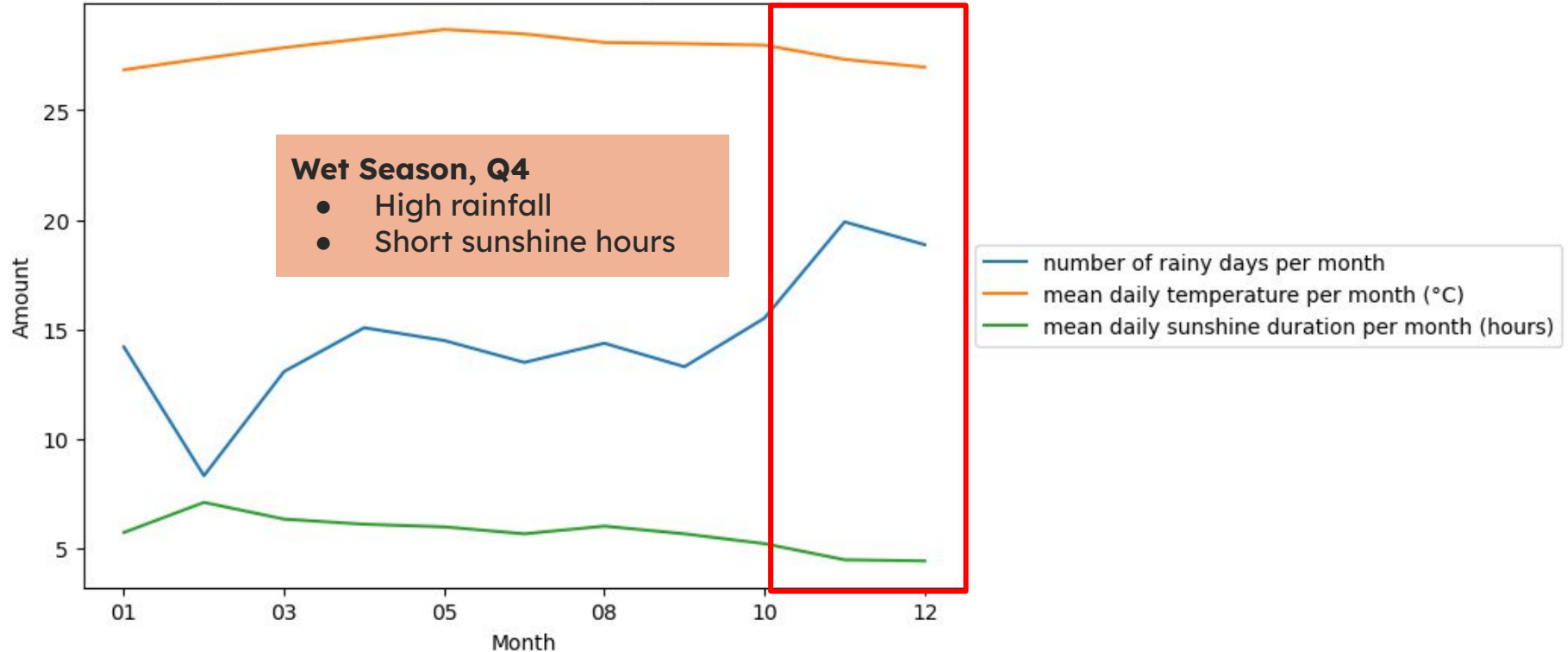Relationship between Sunshine and Rainfall per Month (1999 to 2022)

Legend:
- number of rainy days per month
- mean daily temperature per month (°C)
- mean daily sunshine duration per month (hours)

Monthly Weather Trends in Singapore

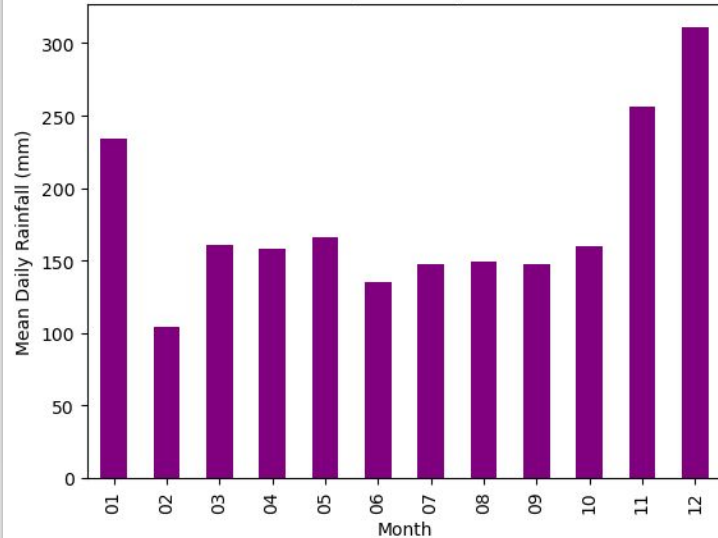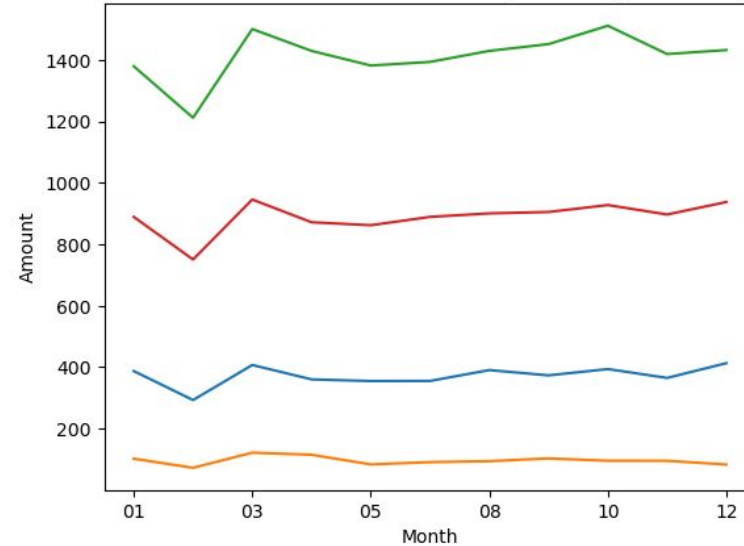Relationship between Sunshine and Rainfall per Month (1999 to 2022)

Dry Season, Q1
- Low rainfall
- Long sunshine hours

Legend:
- number of rainy days per month
- mean daily temperature per month (°C)
- mean daily sunshine duration per month (hours)

Y-axis: Amount
X-axis: Month

Monthly Weather Trends in Singapore

Relationship between Sunshine and Rainfall per Month (1999 to 2022)

Wet Season, Q4
- High rainfall
- Short sunshine hours

Legend:
- number of rainy days per month
- mean daily temperature per month (°C)
- mean daily sunshine duration per month (hours)

Y-axis: Amount
X-axis: Month (01, 03, 05, 08, 10, 12)

Demand for Construction Materials vs. Weather Patterns

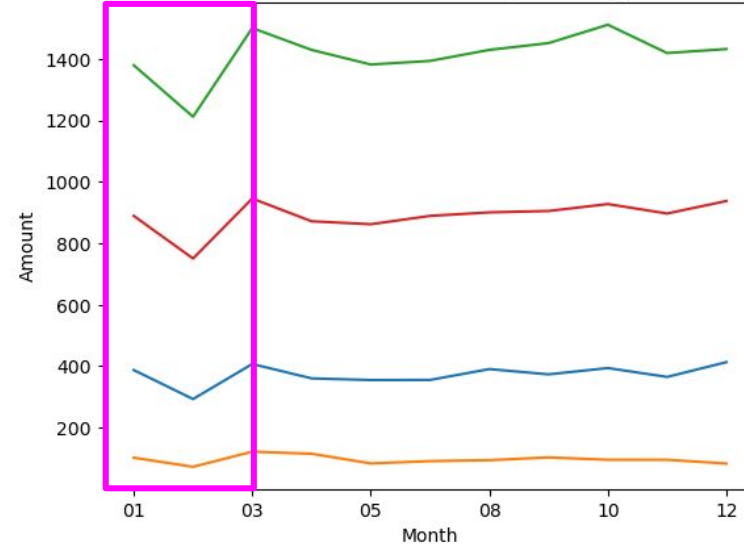# Demand for Construction Materials vs. Weather Patterns

Dry Season, Q1
- Low rainfall
- Long sunshine hours

Mean Daily Rainfall per Month
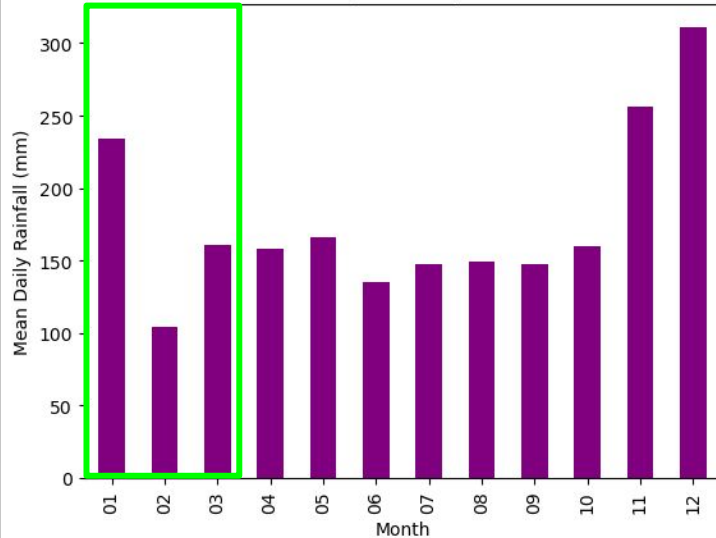
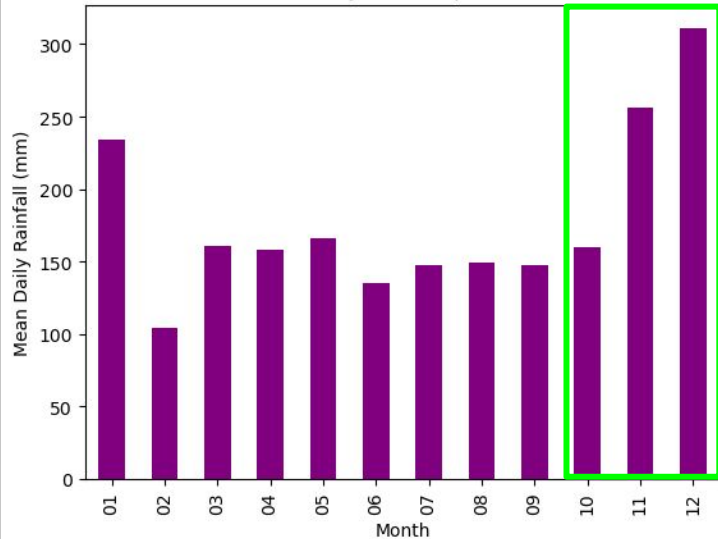Demand for Construction Materials & Total Monthly Rainfall per Month (1999 to 2022)

- cement (thousand tonnes)
- steel bars (thousand tonnes)
- granite (thousand tonnes)
- mixed concrete (thousand cubic metres)

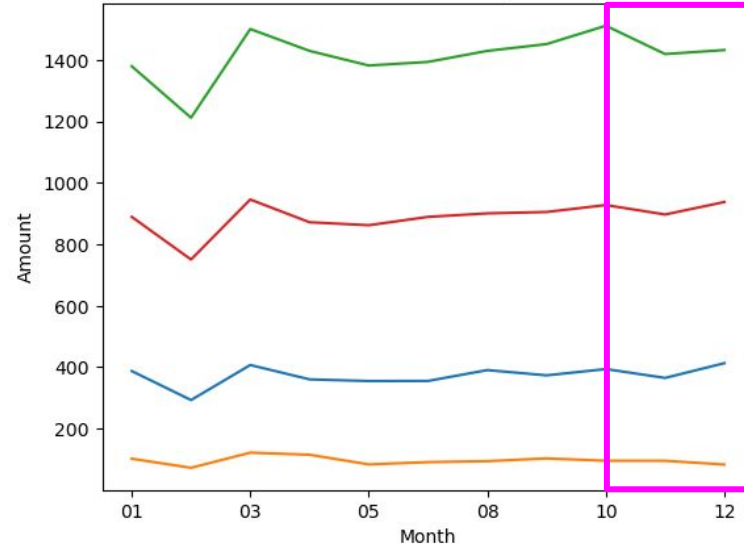# Demand for Construction Materials vs. Weather Patterns

Wet Season, Q4
- High rainfall
- Short sunshine hours

Mean Daily Rainfall per Month

Demand for Construction Materials & Total Monthly Rainfall per Month (1999 to 2022)
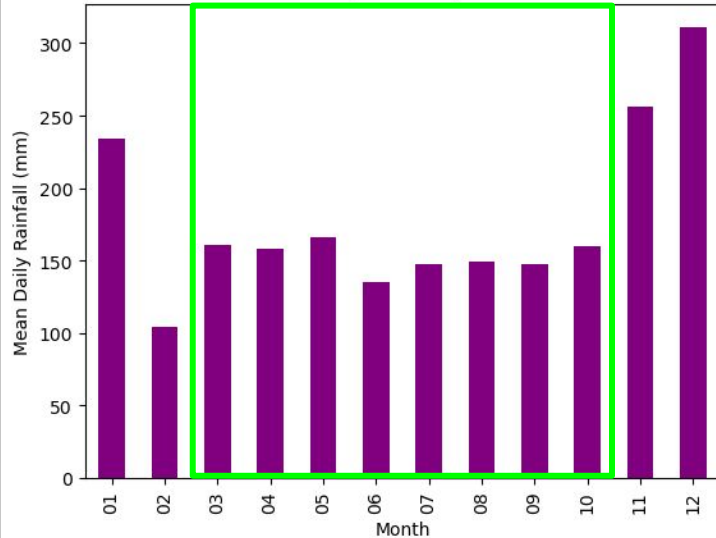
- cement (thousand tonnes)
- steel bars (thousand tonnes)
- granite (thousand tonnes)
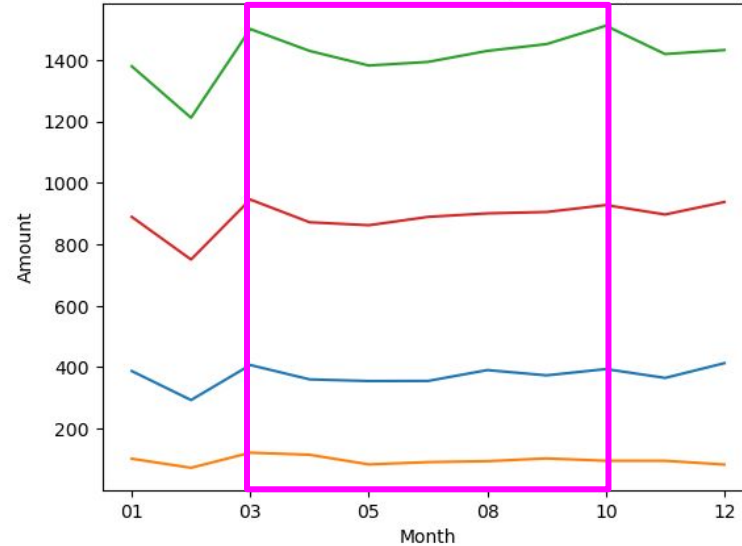- mixed concrete (thousand cubic metres)

Demand for Construction Materials vs. Weather Patterns

Relatively Stable Period

Demand for Construction Materials & Total Monthly Rainfall per Month (1999 to 2022)

Mean Daily Rainfall per Month

Demand for construction materials tends to <mark>drop</mark> during seasons with <mark>extreme weather changes</mark>.

This typically occurs during **February** (dry weather) and **November/December** (wet weather).
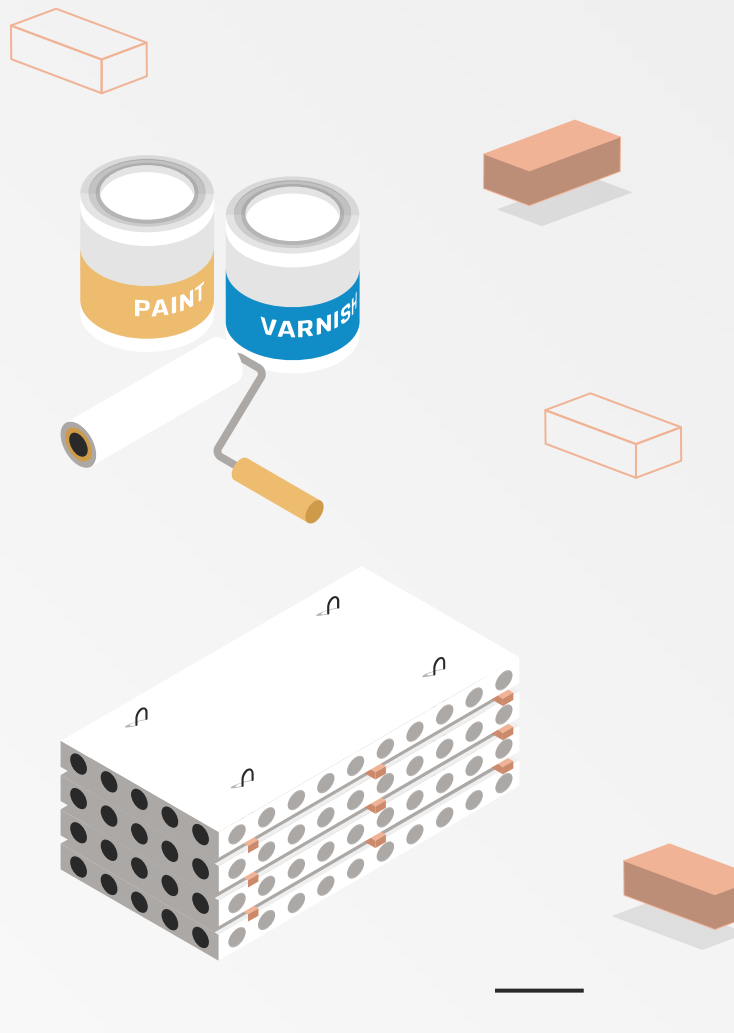

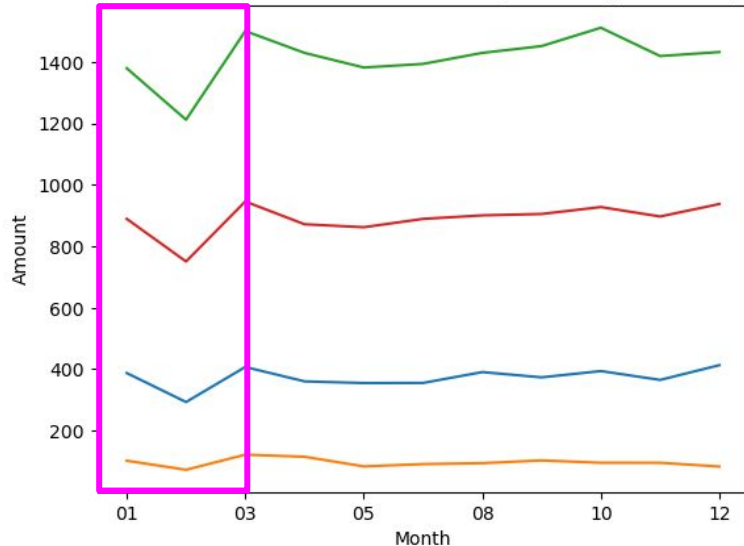
Source: The Straits Times, Mar 2023 and Today, Feb 2018

04
Recommendations

Production Capacity and *Price*

Recommendation #1

Demand for Construction Materials & Total Monthly Rainfall per Month (1999 to 2022)
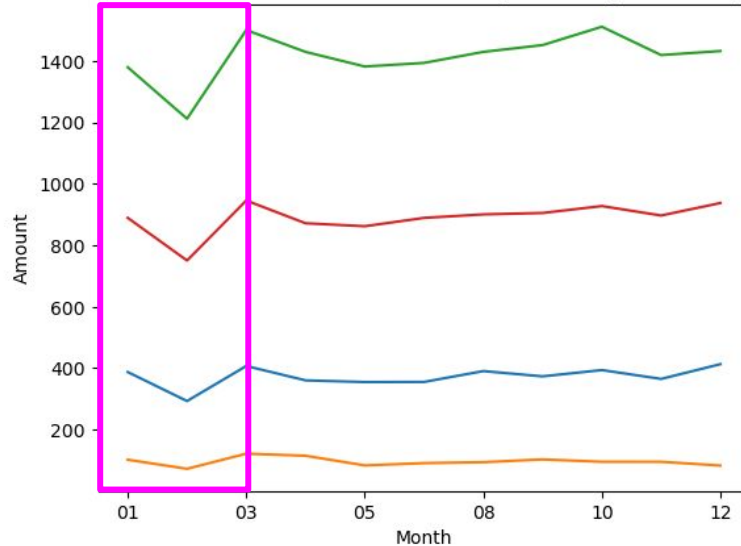
- cement (thousand tonnes)
- steel bars (thousand tonnes)
- granite (thousand tonnes)
- mixed concrete (thousand cubic metres)

Dry Season, Q1

Adjust price downwards to incentivise buyers and reduce the steep drop in demand.

Recommendation #2

Demand for Construction Materials & Total Monthly Rainfall per Month (1999 to 2022)
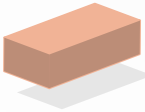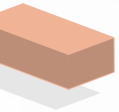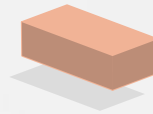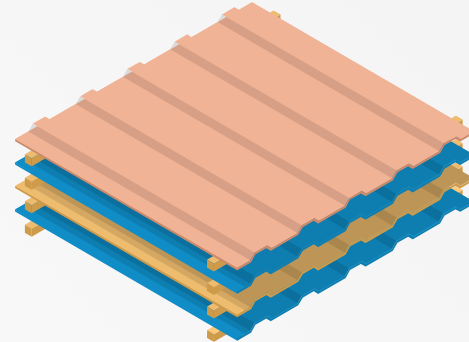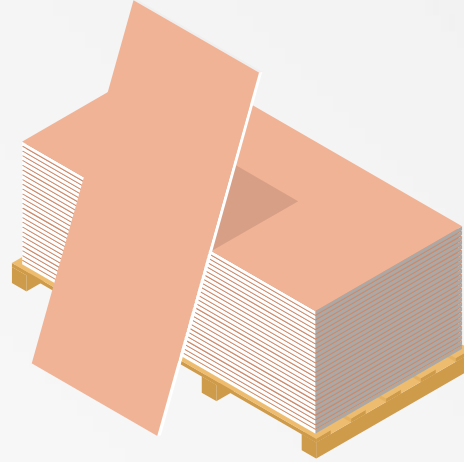
Legend:
- cement (thousand tonnes)
- steel bars (thousand tonnes)
- granite (thousand tonnes)
- mixed concrete (thousand cubic metres)

Dry Season, Q1

Increase production capacity to prepare for the impending demand increase in March, which remains relatively stable thereafter.
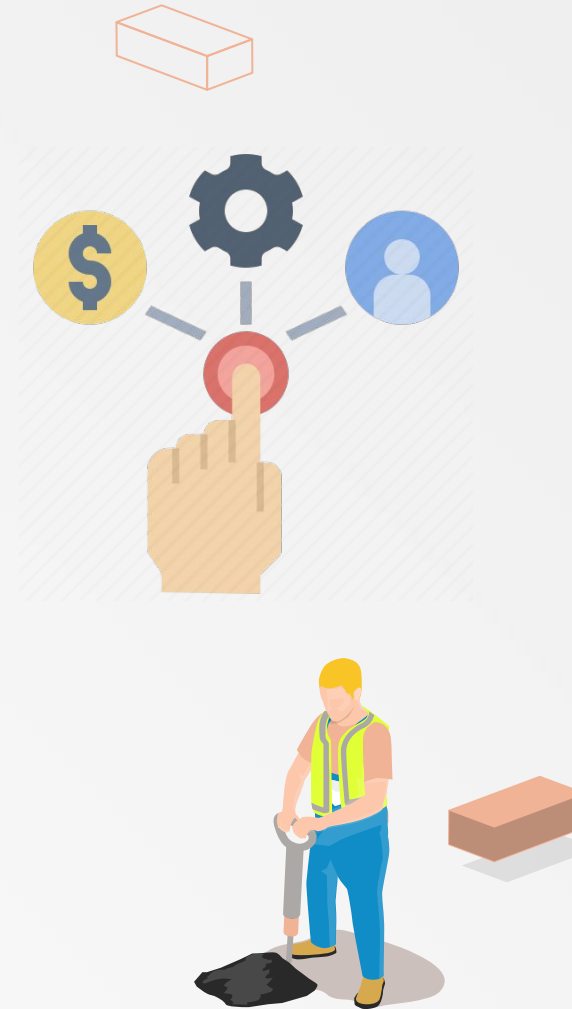
Any other considerations?

Other Considerations

1. Changing economic conditions and price fluctuations

Other Considerations

1. Changing economic conditions and price fluctuations

2. Resource optimisation (company-level)

Other Considerations

1. Changing economic conditions and price fluctuations

2. Resource optimisation (company-level)

3. State of the industry

Source: CNA, May 2021

Source: PropertyGuru, Oct 2023

Thanks!