

Business Analytics: Gypsum & Cement Industries

PREPARED BY
Piyush Tolumbia (2018BTechCSE025)

FACULTY GUIDE
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Department of Computer Science and Engineering
Institute of Engineering and Technology
JK Lakshmipat University, Jaipur

May 2022

Business Analytics: Gypsum & Cement Industries

Practice School – 2

Submitted in partial fulfilment of the requirements
for the degree of

Bachelor of Technology in Computer Science and Engineering

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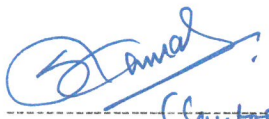


**Department of Computer Science and Engineering
Institute of Engineering and Technology
JK Lakshmipat University, Jaipur**

May 2022

CERTIFICATE

This is to certify that the Practice School-2 project work entitled **Business Analytics: Gypsum & Cement Industries** submitted by **Piyush Tolumbia (2018BTechCSE025)**, towards the partial fulfilment of the requirements for the degree of **Bachelor of Technology in Computer Science and Engineering** of JK Lakshmipat University Jaipur is the record of work carried out by them under my supervision and guidance. In my opinion, the submitted work has reached the level required for being accepted for the Practice School-II examination.


(Santosh Kumar)

for Dr Sonal Jain

Guide and Associate Professor & Head,

Department of Computer Science and
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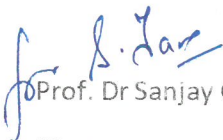
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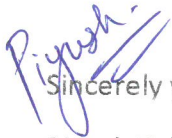
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ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to *Prof. Sanjay Goel, Director, Institute of Engineering & Technology* for bringing in the opportunity to work with *Shree Laxminath Minerals* and for his valuable time and guidance that made this internship a success.

I take this opportunity to thank my industry mentor, *Mr. Lokesh Varma*, for trusting me and providing the best of opportunities to grow during my internship tenure. His exemplary guidance, monitoring, and constant encouragement ignited confidence in me. I would like to express my heartiest thanks to my colleagues and to all those who have helped me directly or indirectly in completing my internship tenure.

I would also like to express my gratitude to thank my faculty mentor, *Dr Sonal Jain*, who has helped me thoroughly with her support, guidance, and inspiration. She has kept me informed of every little detail to help me reach heights by providing the best version of myself to the organization.



Sincerely yours,

Piyush Tolumbia (2018BTechCSE025)

ABSTRACT

The role of the Business Analyst is challenging when it comes to the core understanding of the business domain. Shree Laxminath Minerals is a leading supplier of industrial minerals for cement manufacturing industries. The heart of the business domain lies in dealing with gypsum mould, mineral gypsum, and various other chemical and mineral products.

My internship in SLM focused on transcribing business meetings and jotting down minutes of meetings, drafting purchase orders and purity reports, creating BRDs, and maintaining daily load-unload records. The major component of my internship focused on preparing dashboards for various metrics and presenting them to the stakeholders in monthly general meetings. Business meetings are regularly conducted with both the clients and suppliers in the organization. Preparing minutes of meetings helped in drafting orders and purity reports. Building clients' and suppliers' dashboards to understand the trends was done using Power BI. The organization also conducted training sessions on raw materials, gypsum, and cement composition.

This report focuses on the work done during my internship tenure as Business Analyst with Shree Laxminath Minerals. The drafts and dashboards are attached as images with confidential information blurred or hidden.

Keywords: minerals, gypsum, cement.

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LIST OF ACRONYMS

1. SLM – Shree Laxminath Minerals
2. IBM – The Indian Bureau of Mines
3. DMG – Department of Mines & Geology
4. NMI – National Mineral Inventory
5. UNFC - United Nations Framework Classification

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Chapter 1. INTRODUCTION

1.1 Objective

Business Analyst identifies business areas having the scope of improvement to increase efficiency, strength, market position, profits, and customer satisfaction. The primary objective is to bridge the gap between the technical team and managerial business units to maintain information flow and introduce data-driven decisions. It is essential to understand and apply the technical concepts in maintaining a steady state of business-driven decisions focusing on market strategy and customer satisfaction. Business analytics provide the right set of tools and methodologies to conquer business strategies with technology. It aims at facilitating the identification of results or solutions to different business problems in different settings. The highlight of the role is to interpret the insights and results to identify appropriate course actions for a given managerial solution. Through analytics, we can identify whether a business problem is an issue or an opportunity for the next market conquer.

1.2 Scope

The scope of the report is to highlight my contribution to Shree Laxminath Minerals as a Business Analyst Intern. It gives an insight into the technical and non-technical work done alongside challenges faced at the workplace. It focuses on my business understanding developed over the period by various training sessions, seminars and talks conducted at the organization by higher authorities and dignitaries.

1.3 Limitations

The internship tenure as a Business Analyst has left me with some limitations. That majorly includes the choice of the business unit. As an intern, my roles and responsibility included business domain understanding, providing insights through data analytics, documenting meetings, and drafting monthly progress reports.

Chapter 2. COMPANY PROFILE

2.1 About

Shree Laxminath Minerals was established in the year 2014 as a proprietor firm with an aim of transportation & providing industrial minerals to Cement manufacturing industries at competitive prices business for the Supply of Gypsum Mould, Mineral Gypsum & various other chemical & minerals product. Shree Laxminath Minerals is an innovation-driven enterprise engaged in delivering fully integrated solutions of Raw Material supplies to large and medium cement industrial houses.

SLM is one of the leading suppliers of a quality range of **Coal, Imported Coal, Steam Coal, Limestone, Red Ochre, Raw Gypsum, Gypsum Mould, etc.** The organization is renowned for offering the best quality products to our clients, at the most competitive prices. Since its inception, they have gained expertise in this domain and have been successfully catering to the requirement of various industries with high-quality raw materials.

These products are supplied and tested on the parameters of quality, moisture, impurities and many more. The organisation has a contracted transportation and shipping facility that aids in delivering consignments within the stipulated time frame, thus achieving complete customer satisfaction.

The transparent dealings and competitive prices have helped carve a niche in the industry. With a proven track of offering quality products and proactive services, SLM has established mutually beneficial relationships with their clients across the North & Central region of India.

2.2 Mission & Vision

To be recognized as a National Leader in Organizing Cement Industrial Raw Material Supplies

2.3 Business Model

At Shree Laxminath Minerals, the focus is on organizing the unorganized industrial raw material sector. The basis of the business model finds its origin in the way the organized retail sector emerged to overcome the inefficiencies of the unorganized retail sector.

A cluster-based approach is followed, where the concentration of customers is identified around a particular location through research, mapping activities and trying and giving facilities at that point, to serve the customers flawlessly.

2.4 Solutions Provided

Considering the above inefficiencies, the North & Central region of India is carried out by mapping all the raw materials and mapping the customers requiring the same. Then work is done for the most cost-efficient logistics available in the supply chain. The benefit of better

communication for timely delivery and least cost in the supply chain management gives an edge. These together give a highly competitive edge over the marginal truck operators, which in turn is being leveraged for the better serviceability of the customers.

2.5 Valued Clients

- JK Lakshmi Cement Ltd.
- Udaipur Cement Works.
- Ultratech Nathdwara Cement. (Subsidiary of Ultratech Cement Ltd.).
- Ultratech Cement Ltd.
- JK Cement Ltd.
- Birla Corporation Ltd. Chanderia Chittorgarh
- Wonder Cement Ltd. Nimbahera
- Balaram Cement. Banaskantha Gujrat.

Chapter 3. TRAINING

During the internship, several workshops and seminars were conducted with the objective of business and product understanding. The training provided in-depth knowledge about the chemical composition of gypsum and its applications in various industries.

3.1 Gypsum

The training facilitated focused on the composition, formation, application, chemical constituents, and usage of gypsum in cement and other industries.

Gypsum is a soft sulphate mineral. The main composition of gypsum is *calcium sulphate dihydrate*, with the chemical formula $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$. It is one of the important minerals used by various Indian industries. It is widely mined and is used as a fertilizer and as the main constituent in many forms of plaster, blackboard/sidewalk chalk, and drywall.

Various grades of gypsum are produced and consumed by industries of cement, fertilizer plants, plaster of Paris, drywalls, etc. The mineral is also a neutralizing agent. By mixing soil with gypsum sediments, we can increase the permeability of the soil.

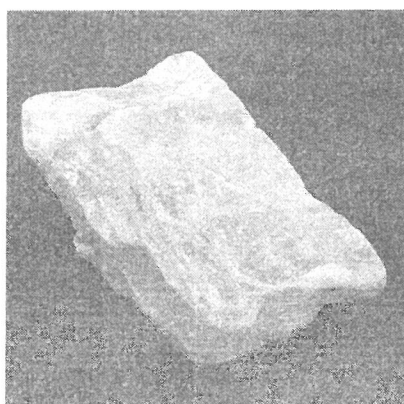


Figure 1: Gypsum Crystal

3.1.1 Physical Properties

The below table lists the physical properties of gypsum.

Table: Physical properties of gypsum	
Property	Description
Lustre	Vitreous to silky, pearly, or waxy
Transparency	Transparent, Translucent, Opaque
Colour	Colourless to white, often tinged other hues due to impurities; colourless in transmitted light.

Streak	White
Hardness	2 on Mohs Scale
Tenacity	Flexible
Cleavage	Perfect Perfect (eminent) and easy on {010}, almost micaceous in some samples; on {100} distinct, yielding a surface with a conchoidal fracture; on {011}, yielding a fibrous fracture {001}.
Fracture	Splintery, Conchoidal
Translation gliding	Readily undergoes translation gliding with $T\{010\}$, $t\{001\}$, which can also be generated by torsion about [001] or bending {010} about [010].
Density	2.31 – 2.33 g/cm ³ (Measured)
Optical Properties	Biaxial (+)
Solubility	Hot, dilute HCL
Crystal Habit	Massive, flat. Elongated and generally prismatic crystals.

3.1.2 Occurrence

Gypsum deposits are found in several countries. Since the geographic conditions of the soil present in different regions contain calcium sulphate dihydrate, not in abundance but enough to crystal gypsum rocks. The leading producers of gypsum are Spain, Thailand, the United States, Turkey, and Russia. The biggest gypsum crystal was found in the Braden mine in Chile exceeding 3 meters in length and 0.4 meters in diameter.

In India, Rajasthan is the leading producer of gypsum. About 99% of gypsum mining is done in the state of Rajasthan and the remaining 1% comes from Jammu and Kashmir and Gujarat. As per the NMI database, based on the UNFC system, India holds 1330 million tonnes of minerals, out of which 37 million tonnes come under the category of *Reserves*, and 1293 million tonnes under the *Remaining Resources* category.

The table below lists the state-wise production of gypsum from 2017 to 2020.

Table: Statewise Production of Gypsum (in tonnes)			
State	2017-18	2018-19	2019-20
Rajasthan	1816834	4664000	3006000
Gujarat	147	46	50

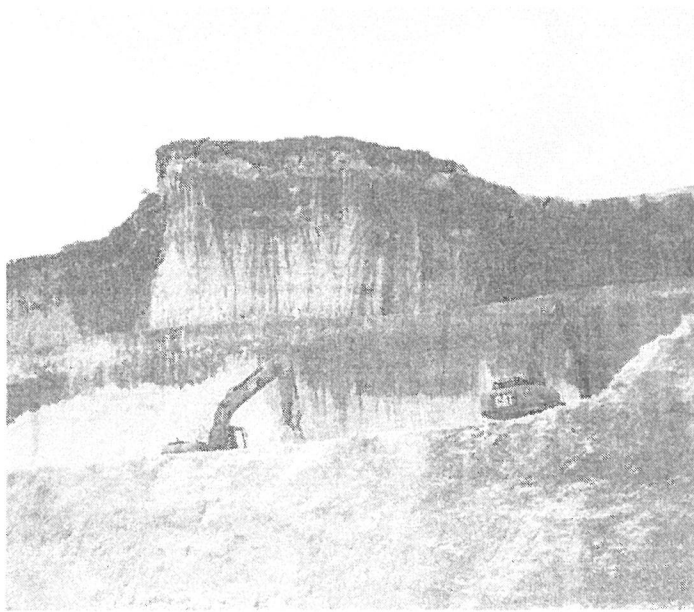


Figure 2: Gypsum Mine in Rajasthan

3.1.3 Uses and Specifications

The main industries to use gypsum as raw products are cement, fertilizer (ammonium sulphate) and plaster of Paris.

Cement and fertilizer (ammonium sulfate) and the plaster that is found in Paris comprise three main industries where gypsum can be utilized. Gypsum with less purity in the form of crushed is utilized in the production of portland cement to regulate the set period of the portland cement (i.e., it acts as a retarder to stop the cement from setting too quickly). Gypsum is added to the clinker before grinding the final cement. The proportion of gypsum used in the Cement Industry is 4-5% of the cement made. Both mineral and by-product products of gypsum are used in the production of cement. Calcined Gypsum is used in the manufacture of Plaster from Paris. It can also be used in the production of pieces of partition, sheets, tiles as well as board insulation for stucco, and latticework. Gypsum board is mostly used for finishing ceilings and walls. It can also be used as an adhesive in the fast-dry tennis court clay. Gypsum that is low-grade is calcined and used to create gypsum mortar after the preparation of mortar. It is utilized to build internal walls and for construction work.

Low-grade Gypsum is required for use in the Building Industry and is no less than 60%. When making pottery, the calcined Gypsum is used to make moulds to produce sanitary wares. The moulds that are discarded and used are then used as a source of gypsum used in cement as well as other industries. Gypsum of low grade is utilized in the conditioning of soils with alkaline elements and as manure for agriculture, primarily to correct black soils with alkali.

High purity gypsum is utilised by the fertilizer industry in producing ammonium sulphate fertilizer. Ground pure white gypsum is used in different industries like paper, paints, and textile goods. Ground low-grade gypsum is used in mine dusting industries of blackboard chalks and as a filler in insecticides. A substantial quantity of mineral gypsum and phosphogypsum is used in the Agricultural sector.

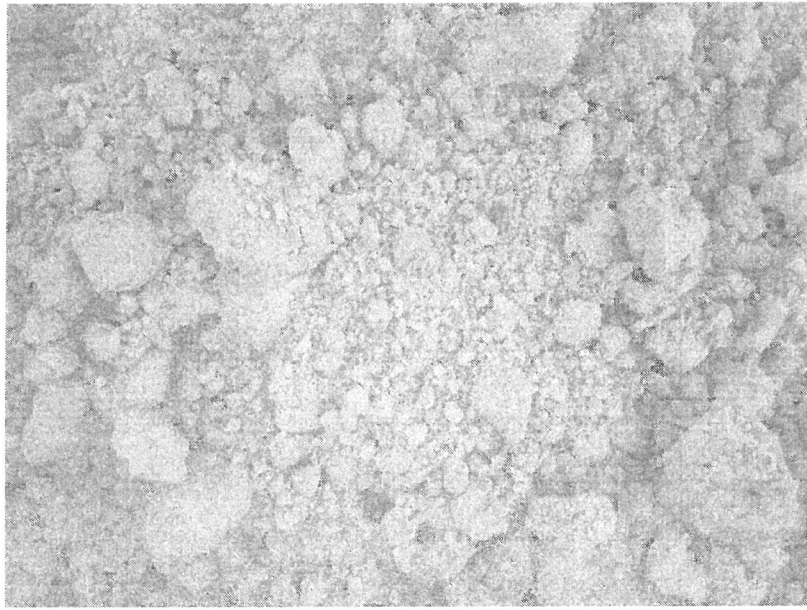


Figure 3: Gypsum rock granules used in cement industries

SLM's client base includes India's several big cement industries. Like JK Cement, Udaipur Cement Works Limited, Birla Cement and many more. Gypsum is supplied to all big plants of these companies.

2. Total Mining Locations

The gypsum supply comes from numerous vendors having mines at Bhim, Kawas, Nagaur, Sanchor, Rateu and many more. As discussed above in the report 90% of India's gypsum reserves are in Rajasthan.

3. Total Vendors

There are majorly 5 big vendors or suppliers of mineral gypsum to SLM.

4. Average Gypsum Load Weight

The average gypsum weight loaded daily for supply comes out to be 540 tonnes.

4.1.2 Vendor Relation Analysis

There are 4 visualizations to discuss the vendor relations:

1. Stock Analysis was done using a Pie graph
2. Average Rate of gypsum provided by various vendors displayed using a bar graph
3. The mining locations in a geospatial map
4. The amount of gypsum exported monthly is presented using a line graph

All the visualizations are interactive and work relatively. So, it becomes efficient to visualize a single client data or vendor data concerning all KPIs and four visualizations.

Chapter 5. BRD – MONTHLY PROGRESS REPORT

5.1 Overview

Business Requirement Document states the requirements and purpose of the business. The main objective is to publish an agreement between two parties to hold the requirements for a particular period. In the case of businesses dealing with the supply of raw material, *BRDs* contain well-documented *Purchase Orders*.

A **Purchase Order** is a document generated by the buyer to the seller that serves the purpose of ordering goods. It specifies the type, quantity, agreed prices, and timeline of the goods. It can also act as a contract between buyer and seller.

In SLM, business requirement documents containing elaborated and documented purchase orders serve as two-way contracts.

1. **Well documented Purchase Orders** provided by the client cement industries for a period of either quarterly, half-yearly or yearly contracts.
2. **Monthly progress report** containing brief information of fulfilled clients' requirements (in terms of quantity and quality both), suppliers records and analysis, company's profit or loss figures and sales amount.

My responsibility revolved around drafting the monthly progress report containing all the required details. The following sections highlight the monthly reports.

The progress reports depend on the highlight of the month. For example, as January is the starting month of the year, most companies prefer to release their purchase order in this month. The order can vary according to the requirement and market evaluation of the minerals. March is the last month of the financial year, so most work is done regarding GST, compiling statements, drafting year returns and many more.

5.2 MPO – February

The progress report for February contained details regarding the company's GST return, and yearly expenses and supplied the client's requirements.

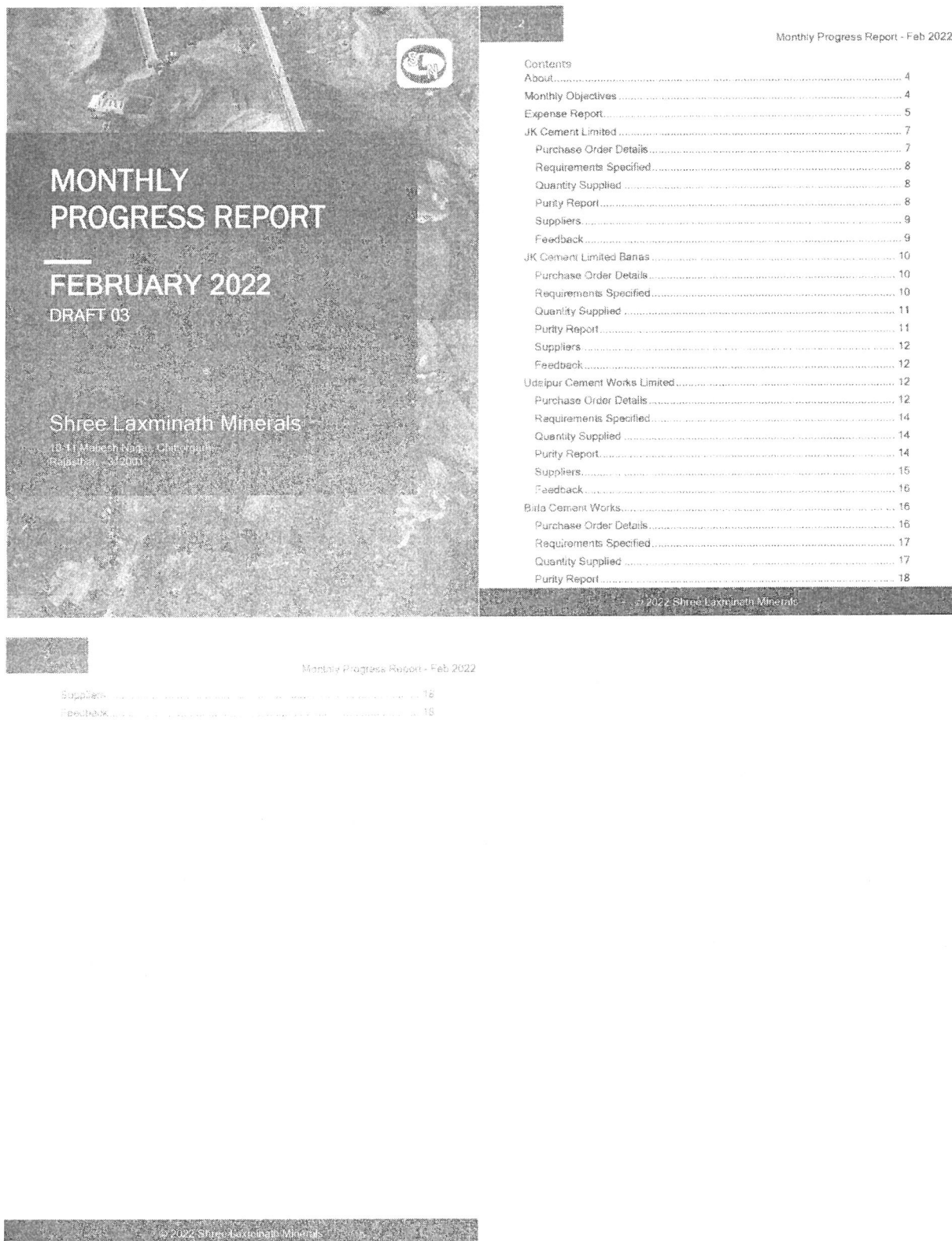


Figure 4: February Progress Report

5.3 MPO – March

March's progress report focused on summing up expenses, taxes, yearly requirements, and yearly purity reports.

Monthly Progress Report - Mar 2022	
MONTHLY PROGRESS REPORT	Contents
MARCH 2022	About
DRAFT 07	Objectives - FY 2022-23
Shree Laxminath Minerals	Sales Report 2021-22
1011 Mahesh Nagar, Chikmagalur	GST Return Details 2021-22
Rampurthi - 57 2001	Expense Report 2021-22
	Expense Report - March 2022
	Monthly Requirement Fulfillment
	Suppliers
	JK Cement Limited
	Purchase Order Details
	Requirements Specified
	Quantity Supplied
	Purity Report
	Suppliers
	Feedback
	JK Cement Limited Banas
	Purchase Order Details
	Requirements Specified
	Quantity Supplied
	Purity Report
	Suppliers
	Feedback
	Udaipur Cement Works Limited
	Purchase Order Details
	Requirements Specified
	Quantity Supplied
	Purity Report
	Suppliers
	Feedback
	© 2022 Shree Laxminath Minerals

Monthly Progress Report - Mar 2022
JK Cement Limited
Purchase Order Details
Requirements Specified
Quantity Supplied
Purity Report
Suppliers
Feedback
Conclusion

Figure 5: March Progress Report

5.4 MPO – April

The draft of the progress report for April sets the new records and plans for the new financial year.

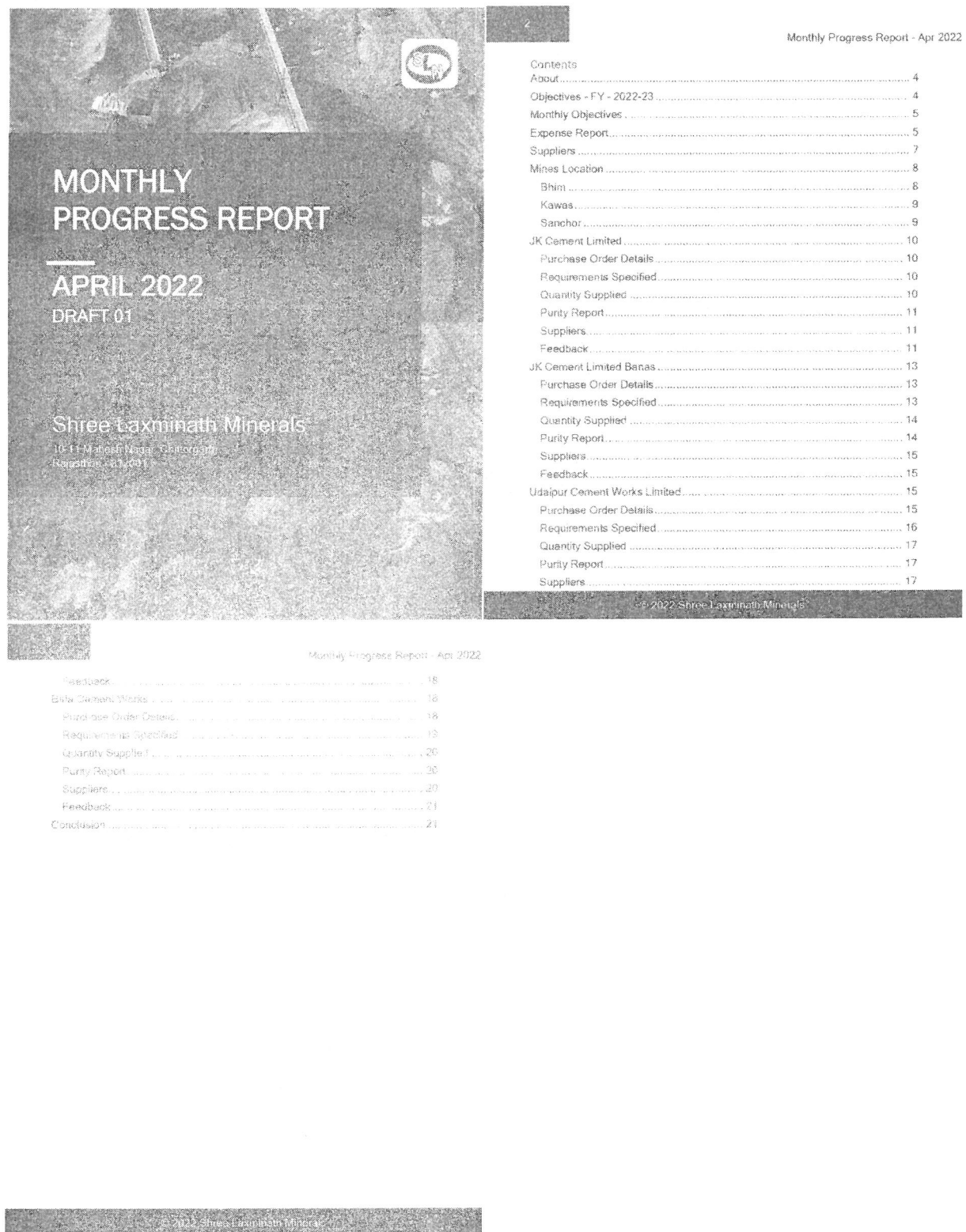


Figure 6: April Progress Report

Chapter 6. DAILY LOAD-UNLOAD RECORDS

The daily record maintenance of raw materials loading from mines location to unloading on cement plants is essential in maintaining data consistency. When a truck is loaded with mined gypsum rocks and granules, it is registered with the Rajasthan Department of Mines & Geology. All the details regarding the truck or vehicle loaded with minerals can be found on the website. Moreover, to maintain the record of every vehicle, suppliers send the *Rawana* number informally. To jot down every detail of supply chain logistics, maintaining a daily logbook is essential.

6.1 Rajasthan Department of Mines & Geology

The **Department of Mines and Geology (DMG)** of Rajasthan is amongst the best-organized DMGs in the country. It has its headquarters at Udaipur. The Raj DMG comprises a core team of numerous intellectual talents who are the best in their fields. There are 79 Geo-scientists, 61 Mining Engineers, 7 Scientists in the Chemical Laboratory and 7 engineers in the Drilling wing. The team possess state-of-the-art equipment and techniques for mineral exploration.

The department includes Remote Sensing and Geophysical surveys which helps in providing Chemical, Ceramic and Ore dressing laboratories. Vision 2020 – Strategy for Sustainable Mineral Development is the latest venture of DMG, which is a charismatic and strong directive towards the mission and vision of the department in the first twenty years of the century.

6.2 E-RAWANA

The screenshot displays the E-Rawana portal interface. At the top, it shows the DMG Rajasthan logo and the Government of Rajasthan Department of Mines & Geology, Rajasthan. A QR code is visible on the right. The main section displays the following information:

Generated on: 11-May-2022 01:59:20 PM	
Confirmed on: 11-May-2022 02:00:30 PM	
Lease No:	[REDACTED]
Name of the vehicle:	Shiva Ram
Vehicle Licence:	[REDACTED]
Minerals:	Gypsum
Net Mineral Weight:	[REDACTED]
Tare Weight:	[REDACTED]
Driver Details:	[REDACTED]
Consignee Name:	UDAIPIR CEMENT WORKS LIMITED (SHREE LAXMINATH MINERALS)
Consignee Address:	Dabok, Dabok, Vallabh Nagar, Udaipur, Rajasthan.
Approximate Distance:	800 Km
Collection Through:	[REDACTED]
Royalty:	[REDACTED]
CHART:	[REDACTED]
ASST:	[REDACTED]
Permit Fee:	[REDACTED]
Purchase Amount:	[REDACTED]
Royalty Settlement Bank:	[REDACTED]
Weight Bridge:	[REDACTED]

Below the table, there are two image sections: "Front Image" and "Side Image". The "Front Image" shows a white truck parked on a dirt road. The "Side Image" shows the same truck from a side angle, parked on a dirt road.

Figure 7: E-Rawana

E-Rawana contains all the information on vehicles loaded from several mine locations to the cement industry plant. All the details are taken from this e-rawana and fed into the daily logbook records.

Chapter 7. CONCLUSION

The internship program has helped me gain real-world experience as a Business Analyst. The tenure has proven that no industry is left untouched by technology. If not, development then factors like data analytics, data reporting through visualizations and stories, advanced excel formulation and many more have helped many businesses foster in the market. The cement industries and mining industries are no different. SLM dealing with the supplies of raw materials takes into consideration every little detail and focuses on perfect market deliveries.

The supply gypsum to the big cement industries directly from the miners or suppliers ensures quality and facilitates required purity in the mineral. Through this internship, I have learnt the integration of *core business case studies* with *supply chain management, daily logging and monitoring, data analytics, dashboarding* through Microsoft Power BI, *reporting and drafting progress reports*.

Chapter 8. References

- [1] Berezin, T. (1999). Writing a Software Requirements Document. *Adelphi University*, 14.
- [2] Richards, D., & Marrone, M. (2014). Identifying the education needs of the business analyst: an Australian study. *Australasian Journal of Information Systems*, 18(2).
- [3] Papageorgiou, A., Tzouvalas, G., & Tsimas, S. (2005). Use of inorganic setting retarders in cement industry. *Cement and Concrete Composites*, 27(2), 183-189.
- [4] Koukouzas, N., & Vasilatos, C. (2008). Mineralogical and chemical properties of FGD gypsum from Florina, Greece. *Journal of Chemical Technology & Biotechnology: International Research in Process, Environmental & Clean Technology*, 83(1), 20-26.
- [5] Das, A. (2012). Who extracts minerals more efficiently—public or private firms? A study of Indian mining industry. *Journal of Policy Modeling*, 34(5), 755-766.
- [6] Kirkland, D. W., & Evans, R. (1976). Origin of limestone buttes, gypsum plain, Culberson County, Texas. *AAPG Bulletin*, 60(11), 2005-2018.
- [7] Stadtler, H. (2008). Supply chain management—an overview. *Supply chain management and advanced planning*, 9-36.



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Suppliers in all Kinds Minerals

10-11, Mahesh Nagar, Chittorgarh (Raj.) 312001

Mobile : 9875744559, 9414312567 • Email : minerals.banas@gmail.com

Ref. No.

INTERNSHIP CERTIFICATE

Date.....

Date: 24/05/2022

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Piyush Tolumbia** has done his internship as **Business Analyst** at **Shree Laxminath Minerals**, from February 01, 2022 to May 31, 2022 for the duration of 4 months.

He has worked on a project titled **Business Analytics - Gypsum & Cement Industries**. This project was aimed at analyzing the business requirements and providing insights on use cases through technical analysis. As part of the project, he has created monthly progress reports, minutes of meetings, drafted purchase orders, vendor dashboard to analyze company's vendors and suppliers.

During his internship he has demonstrated his skills with self-motivation to learn new skills. His performance exceeded our expectations, and he was able to complete the project on time.

We wish him all the best for his upcoming career.

Shree Laxminath Minerals

Lokesh Varma

Manager
For Shree Laxminath Minerals

Prop./Auth. Sign.
[Signature][Seal of Company]