INDUSTRIAL TRAINING REPORT

AT

Nestlé India Limited, Pantnagar

Nestlé

Good Food, Good Life

Shivansh Bansal

B.tech(Chemical engineering)

ACKNOWLEDGEMENT

The internship opportunity, I had with Nestle India Pvt. Ltd. was a great opportunity for learning and professional development. Therefore, I consider myself a very lucky individual as I was provided with an opportunity to be a part of it. I am also grateful for having a chance to meet so many wonderful people and professionals who led me through this internship period.

I am using this opportunity to express my deepest gratitude and special thanks to the Head of Department Mr. Rahul Yadav and Section Head Mr. Nitin Rana who despite being extraordinarily busy with their duties, took time out to hear, guide, and keep me on the correct path and allow me to carry out the training at the esteemed organization.

I express my deepest thanks to all the professionals, officers, who guided me by giving necessary advice and to make it easier. I choose this moment to acknowledge their contribution gratefully.

I render my heart-felt thanks to Nestlé India Limited Pantnagar factory team members who have extended their cooperation in making my training at Pantnagar Factory a significant success.

Finally, this project would not have been possible without the confidence, endurance and support of my family.

CERTIFICATE

This is to certify that the project entitled "**WASTE REDUCTION AT NOODLE PRODUCTION IN PHASE-2"** is an original research project work carried by **Shivansh Bansal** in partial fulfillment of the requirement for the degree of Btech Chemical Engineering, during period from 10 June 2024 to 24 JULY 2024, under my direct supervision.

Mr. Rahul Yadav

H.O.D Phase II

Nestle India Ltd. Pantnagar

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Mr. Nitin Rana

H.O.D Phase II

Nestle India Ltd. Pantnagar

DECLARATION

I Mr. Shivansh Bansal , a student of Btech(Chemical Engineering),Pandit Deendayal Energy University,Gandhinagar, hereby declare that the major project has been submitted by me in the partial fulfillment of the requirement for the award of degree of Btech(Chemical Engineering).

This is a bonafied work done from 10th June 2024 to 24th July 2024.

I further admit that this project work has not been submitted by me for any other purpose to any other university/institute/organization.

Date : 04/07/2024

Place : Pantnagar

INTRODUCTION

NESTLÉ HISTORY

(1866-1905)

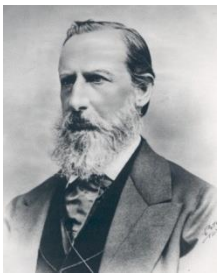
1866

Our history begins back in 1866, when the first European condensed milk factory was opened in Cham, Switzerland, by the Anglo-Swiss Condensed Milk Company by Charles (US consul in Switzerland) and George Page, two brothers from, USA.

1867

In Vevey, Switzerland, our founder Henri Nestlé, a German pharmacist, launched his Farine lactée, a combination of cow's milk, wheat flour and sugar, saving the life of a neighbor's child. First time production of Farine lactéewas 551 litres.

NESTLÉ VEVEY, SWITZERLAND The Nestlé Company, which had been purchased from Henri Nestlé by Jules Monnerat in 1875, responded by launching a condensed milk prodact of its own. In 1882 Swiss miller Julius Maggi created a food product utilizing legumes that was quick to prepare and easy to digest.





HENRI NESTLÉ FARINE LACTEE FIRST LOGO OF NESTLÉ MAGGI(1905-1918)

The Anglo-Swiss Condensed Milk Company, founded by Americans Charles and George Page, merged with Nestlé after a couple of decades in 1905 to form the Nestlé and Anglo- Swiss Milk Company.

By war's end, the Company had 40 factories, and its world production had more than doubled since 1914. 1918-1938

1925

The 1920s were a time of deep economic hardship, and Nestlé suffered severe difficulties along with much of the world. In 1921, the Company recorded its first loss. Rising prices for raw materials, the worldwide post-war economic slowdown, and deteriorating exchange rates deepened the gloom.

1938

Nescafé Coffee Was Launched.

1938-1945

On onset of World War II profits dropped from $20 million in 1938 to $6 million in 1939. Factories were established in developing countries,particularly in Latin America. Ironically, the war helped with the introduction of the company's newest product, Nescafé ("Nestle's Coffee").

1945-1975

1947

The Maggi products, from seasoning to soups, become part of the Nestlé family following the merger with Alimentana S.A.

1974

For the first time we diversified outside the food industry when we became a major shareholder in L'Oreal, one of the world's leading makers of cosmetics.

1975-1996

After the agreement with L'Oreal in 1974, Nestlé's overall position changed rapidly. Finally, between 1975 and 1977, the price of coffee beans quadrupled, and the price of cocoa tripled.

1986

The Nespresso story began in 1986 with a simple idea: enable anyone to create the perfect cup of espresso coffee, just like a skilled barista

NESPRESSO

1988

The Italian brand Buitoni, in Sansepolcro, became part of our portfolio in 1988

Buitoni®

2005

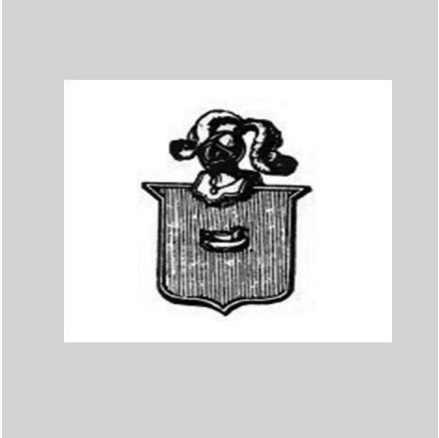
Our Chairman Peter Brabeck-Letmathe recognized that the eating habits of the world's population were changing and we began our own transformation.

NESTLÉ LOGO HISTORY

The Nestlé logo was launched by Henri Nestlé in 1868 on the basis of the meaning of his name in German, i.e. little nest, and of his family emblem (that you can see here).

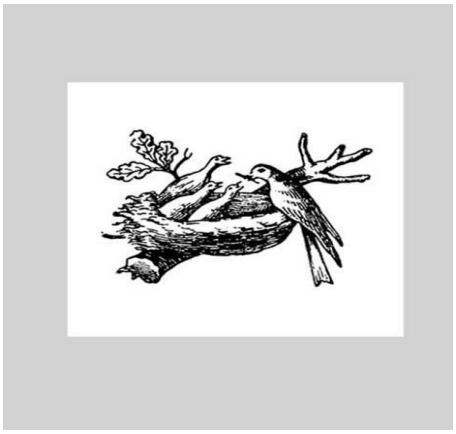
Pre-1868

Henri Nestlé's first trademark is based on his family's coat of arms. It features a bird on a nest, which is a reference to the family name, meaning 'nest' in German.



1868

Henri Nestlé uses his coat of arms as inspiration for the company's new logo. He adds three baby birds into the nest, which are being fed by their mother. This new image links his family name to his infant cereal products and helps protect his brand from imitators.



1938

The Nestlé lettering and logo are now combined to create an umbrella brand icon. This becomes the unifying distinguishing mark for different Nestlé brands across the world.

1966

The combined trademark is evolved in celebration of the Nestlé company's 100th anniversary. It features a new font and a modernized image.

1988

Nestlé product categories are given standardized names in combination with the Nestlé signature. The logo image is reduced to two young birds and the brand lettering is placed underneath. This now becomes the strategic umbrella trademark for the company.

1995

Nestlé product categories are given standardized names in combination with the Nestlé signature. The logo image is reduced to two young birds and the brand lettering is placed underneath. This now becomes the strategic umbrella trademark for the company.

2015

The logo design is simplified and softened. This makes it easier to read on modern digital devices like tablets and smartphones.

2018

In 2018, the color of the Nestlé logo was changed from gray to oak brown. This better reflected the color of the tree branch and gave the logo more warmth.

KEY DATES

1866	Foundation of Anglo-Swiss Condensed Milk Co.
1867	Henry Nestlé's Infant cereal developed
1905	Nestlé and Anglo Swiss Condensed Milk Co. (new name after merger)
1929	Merger with Peter, Cailler, Kohler ChocolatsSuissesS.A
1934	Launch of Milo
1938	Launch of Nescafé
1947	Nestlé Alimentana S.A. (New name after merger with Maggi)
1948	Launch of Nextea and Nesquik
1969	Vittel (initially equity interest only)
1971	Merger with Ursina-Franck
1973	Stouffer (with Lean Cuisine)
1974	L'Oreal (associate)
1977	Nestlé S.A. (new company name)
1981	Galderma (joint venture with L'Oréal)
1985	Carnation (with Coffee Mate and Friskies)
1986	Creation of Nestlé Nespresso S.A.
1988	Buitoni-Perugina, Rowntree (with Kit Kat)
1990	Cereal Partners Worldwide (joint venture with General Mills)
1991	Beverage Partners Worldwide (joint venture with Coca-Cola)
1992	Perrier (with Poland Spring)
1993	Creation of Nestlé Sources Internationales (2002: Nestlé Waters)
1997	Creation of Nutrition Strategic Business Division (2006: Nestlé Nutrition)
1998	San Pellegrino and Spillers Petfoods
	Launch of Nestlé Pure Life
2000	PowerBar

2001	Ralston Purina
2002	Schöller and Chef America Dairy Partners Americas (joint venture with Fonterra)
	Laboratoiresinnéov (joint venture with L'Oréal)
2003	Mövenpick and Dreyer's
2005	Wagner, Protčika and Musashi
2006	Acquisition of Uncle Tobys and Jenny Craig Creation of FoodServicesStrategie Business Division
	Lactalis Nestlé Produitsrais (associate)
	Jenny Craig, Uncle Tobys and Delta Ice Cream
2007	Acquisition of Novartis Medical Nutrition, Gerber and Henniez

MAIN KEY/BRANDS

Coffee	Nescafé, Nespresso, Taster's Choice, Ricoré, Ricoffy, Bonka. Zoégas, Loumidis
Water	Poland Spring, Nestlé Pure Life, Arrowhead, Vittel, Deer Park Levissima, Perrier, S.Pellegrino, Ozarka, Contrex, Ice Mountain Zephyrhills, Nestlé Aquarel, Hépar, Acqua Panna
Other Beverages	Nestea, Nesquik, Nescau, Milo, Carnation, Libby's, Caro Nestomalt, Nestlé
Dairy – Shelf Stable	Nestlé, Nido, Nespray, Ninho, Carnation, Milkmaid, La Lechera, Moça, Klim, Gloria, Svelty, Molico, Nestlé Omega Plus, Bear Brand, Coffee-Mate
Dairy – Chilled	Nestlé, Sveltesse, La Laitière, La Lechera, Ski, Yoco, Svelty. Molico, LC1, Chiquitin
Ice cream	Nestlé, AnticaGelateria del Corso, Dreyer's/Edy's Drumstick/Extrême, Maxibon/Tandem, Mega,

	Mövenpick, Sin Parar/SemParar/Non Stop, Delta
Infant Nutrition	Nestlé, Nan, Lactogen, Beba, Nestogen, Cerelac, Nestum, Neslac, Guigoz, Good Start
Performance Nutrition	PowerBar, Pria, Musashi
Health Care Nutrition	Nutren, Clinutren, Peptamen, Modulen
Bouillons, soups seasonings, pasta, sauces	Maggi, Buitoni, Thomy, Winiary, Torchin, Osem, Totole, Haoji
Frozen foods (prepared dishes, pizzas, small meals)	Stouffer's, Lean Cuisine, Hot Pockets, Buitoni, Maggi, Wagner, La Cocinera
Chocolate, Confectionary & Biscuits	Nestlé, Crunch, Cailler, Galak/Milkybar, Kit Kat, Smarties Butterfinger, Aero, Polo

NESTLÉ WORLDWIDE

Nestlé is divided into 3 regions in world:

1. North & Latin American Region
2. Europe Region
3. Asia, Oceania & Australia Region

Nestlé in South Asia Region (SAR)

Nestlé has a strong presence in South Asia with operations in

1. India
2. Sri Lanka
3. Bangladesh
4. Pakistan

South Asia region comes under Asia, Oceania & Australia Region

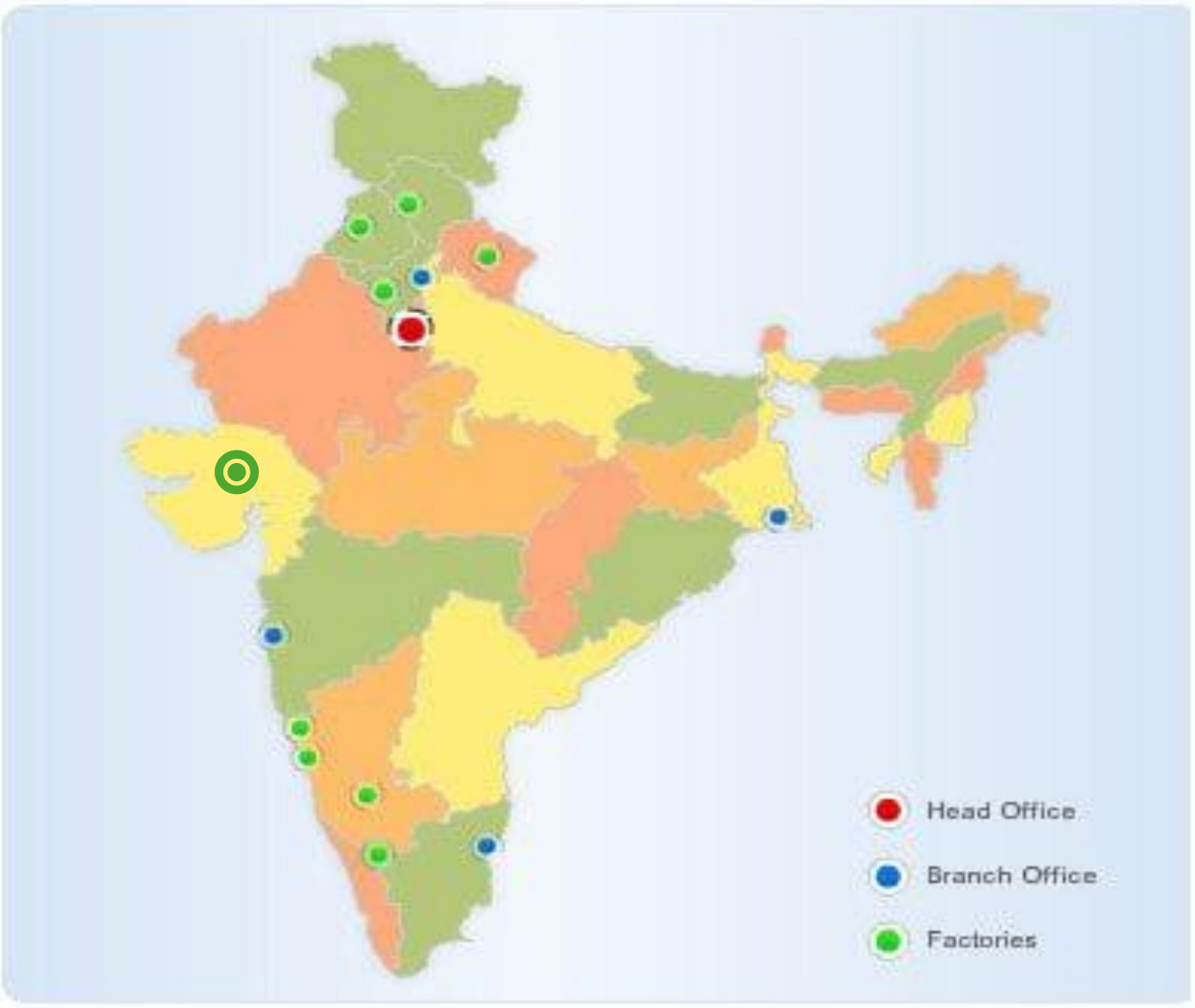
We are having 12 factories in South Asia Region, 9 in India and one-one each in Sri Lanka Pakistan and Bangladesh.

NESTLÉ INDIA LIMITED

After more than a century-old association with the country, today, NESTLÉ India has presence across India with 9 manufacturing facilities and 4 branch offices.

NESTLÉ India set up its first manufacturing facility at Moga (Punjab) in 1961 followed by its manufacturing facilities at Choladi (Tamil Nadu), in 1967; Nanjangud (Karnataka), in 1989; Samalkha (Haryana), in 1992; Ponda and Bicholim (Goa), in 1995 and 1997, respectively; and Pantnagar (Uttarakhand), in 2006. In 2012, Nestlé India set up its 8th manufacturing facility at Tahliwal (Himachal Pradesh). In October 2020, Nestle India announced investment of Rs. 2,600 crores for a new plant at Sanand in Gujarat. Initial phase of production commenced from 1 October 2021

The 4 Branch Offices located at Delhi, Mumbai, Chennai and Kolkata help facilitate the sales and marketing activities. The NESTLÉ India's Head Office is located in Gurgaon, Haryana.



Nestlé India currently has 9 manufacturing facilities across India. They are at:

1. Moga, Punjab
2. Samalkha, Haryana
3. Nanjangud, Karnataka
4. Choladi, Tamil Nadu
5. Ponda, Goa
6. Bicholim, Goa

7. Pantnagar, Uttarakhand

8. Tahliwal, Himachal Pradesh

9. Sanand. Gujarat

Moga(Punjab) in 1961

Products:

Baby Food, Milk Products, Culinary Cereal

Choladi(Tamil Nadu) in 1967

Products:

Beverages(Green Tea)

Nangangud(Karnatka) in 1989

Products:

Processing of Coffee Bean Culinary, Prepared Dishes

Samalkha(Haryana) in 1993

Products:

Baby Food, UHT

Ponda(Goa) in 1995

Products:

Confectionary

Bicholim(Goa) in 1997

Products:

Culinary, Sauce& Ketchup

Pantnagar(Uttarakhand) in 2006

Products:

Culinay, Beverages, Seasoning

Tahliwal(Himachal Pradesh) in 2012

Products:

Confectionary, Culinary Products

Sanand(Gujarat) in 2021

Products:

Culinary, Seasoning

NESTLÉ PANTNAGAR

It was established on 26 October 2006 in the area of approximately 20 acre. Pantnagar Factory is divided into 3 Phases.

Phasel-First 4 Noodles lines are categorized as phase-1.

Phase2- Remaining 3 Noodles lines + Pazzta line is known as phase2.

Phase3- Consists of Tastemaker Manufacturing, Vending Mixes and HPP plant.

Manufacturing Brands of Nestlé Pantnagar


Maggi
PAZZTA
CHEESY TOMATO TWIST
TRULY GOOD
100% Suji/Rawa*


Maggi
PAZZTA
MUSHROOM PENNE
TRULY GOOD


Maggi
PAZZTA
MASALA PENNE
FAMILY SAVER PACK
TRULY GOOD


Maggi
2-Minute noodles
Your Favourite Masala Taste
TRULY GOOD
with Goodness of IRON
SUGGESTED GARNISHING
Masala*
Instant Noodles with Seasoning*

ORGANIZATIONAL CHART AND KEY FUNCTION

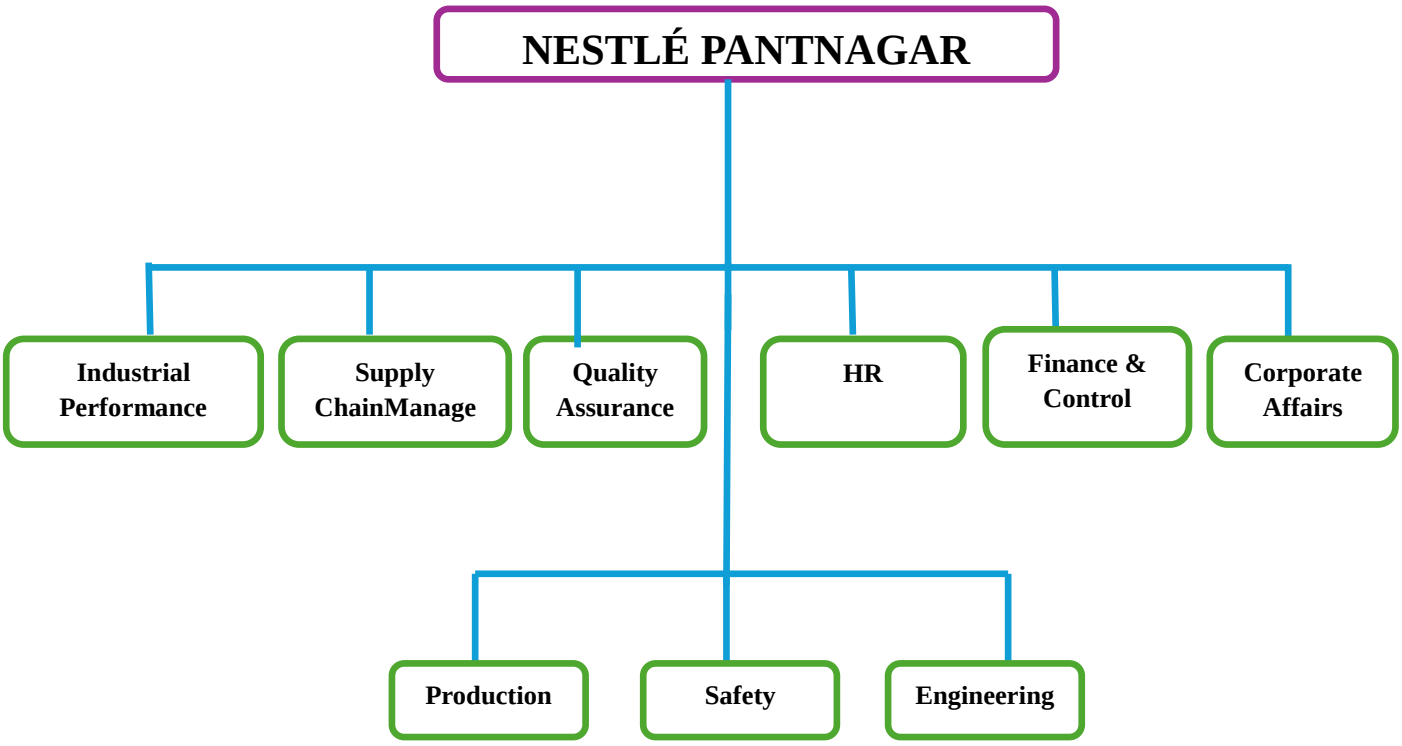
- Industrial Performance (IP)
- Human Resource
- Production

➢Phase 1

➢Phase 2

➢Phase 3

- Quality Assurance
- Safety
- Engineering
- Supply Chain Management (SCM)
- Total Productivity Management
- Corporate Affairs
- Finance & Control



1.SCM(Supply Chain Management):

- Managing internal processing of materials into finished goods

- The movement of finished goods out of the organization and toward the end- consumer
- Daily production and distribution planning, including all nodes in the supply chain.
- Production scheduling for each manufacturing facility in the supply chain
- Demand planning and forecasting, coordinating the demand forecast of all customers and sharing the forecast with all suppliers.

2. QA(Quality Assurance):

- To ensure best quality of all the raw materials, semi finished and finished products
- To perform quality checks- sensory, analytical and microbial checks Ensure compliance with National and International standards
- Food safety
- Deal with consumer complaints
- Set standards
- Quality Audits

3. HR:

Human resource management systems encompass:

- Payrollo
- Time and Attendance

- Performance appraisal
- Benefits administration
- HR management information system
- Recruiting/Learning management
- Performance record
- Employee self-service
- Scheduling
- Absent management

4. Finance & Control:

- Annual Badgeting
- At the base level, finance department is responsible for all the day to day transactional accounting for the business.D
- Pay-rolling and payments of salaries and pensions.
- The finance department will work with managers to prepare the organization's budgets and forecasts, and to report back on the progress against these throughout the year.

5. Corporate affairs:

- Corporate Affairs manages communication with a range of audiences including: Community, Government, Media, Employees and Investors

- Their role includes managing crises, introducing new products, negotiating prices, managing media placement, writing the company newsletter and updating the investment community on the R&D pipeline.
- Corporate Affairs professionals focus on proactive and meaningful relations with the Community, Government, Media, Employees and Investors and any other groups that can potentially impact on their organization's ability to operate favorably. They manage issues to create competitive opportunities.

6. Production:

- This department is responsible for the entire manufacturing process, turning raw materials into finished goods.
- Identify the engineering or technical aspects of the production process.
- Assess how long it will take to plan production.
- Monitor progress, carrying out work studies and inspections.
- To ensure smooth production process and production of finished good as per plan

7. Engineering:

- An engineering department will carry out any repairs necessary on exiting tooling, make new tools jigsand/orfixtures that are required, and even possibly handle production
- To sort out process faults, design and implement improvements
- Maintenance and repair of engineering products
- Responsibility of technical store

8. Safety:

- To ensure that the company provides a safe working environment for all employees as well contractual laborers
- To ensure that all the company activities are undertaken in a safe manner, and The company complies with the requirements of the Health and Safety at Work Act and other relevant legislation
- Provides expert advice on safety matters
- Develops policies on safety issues and prepares codes of practice and guidance notes as appropriate
- Investigates accidents and near misses
- Runs a safety training program and provides advice on specialist needs

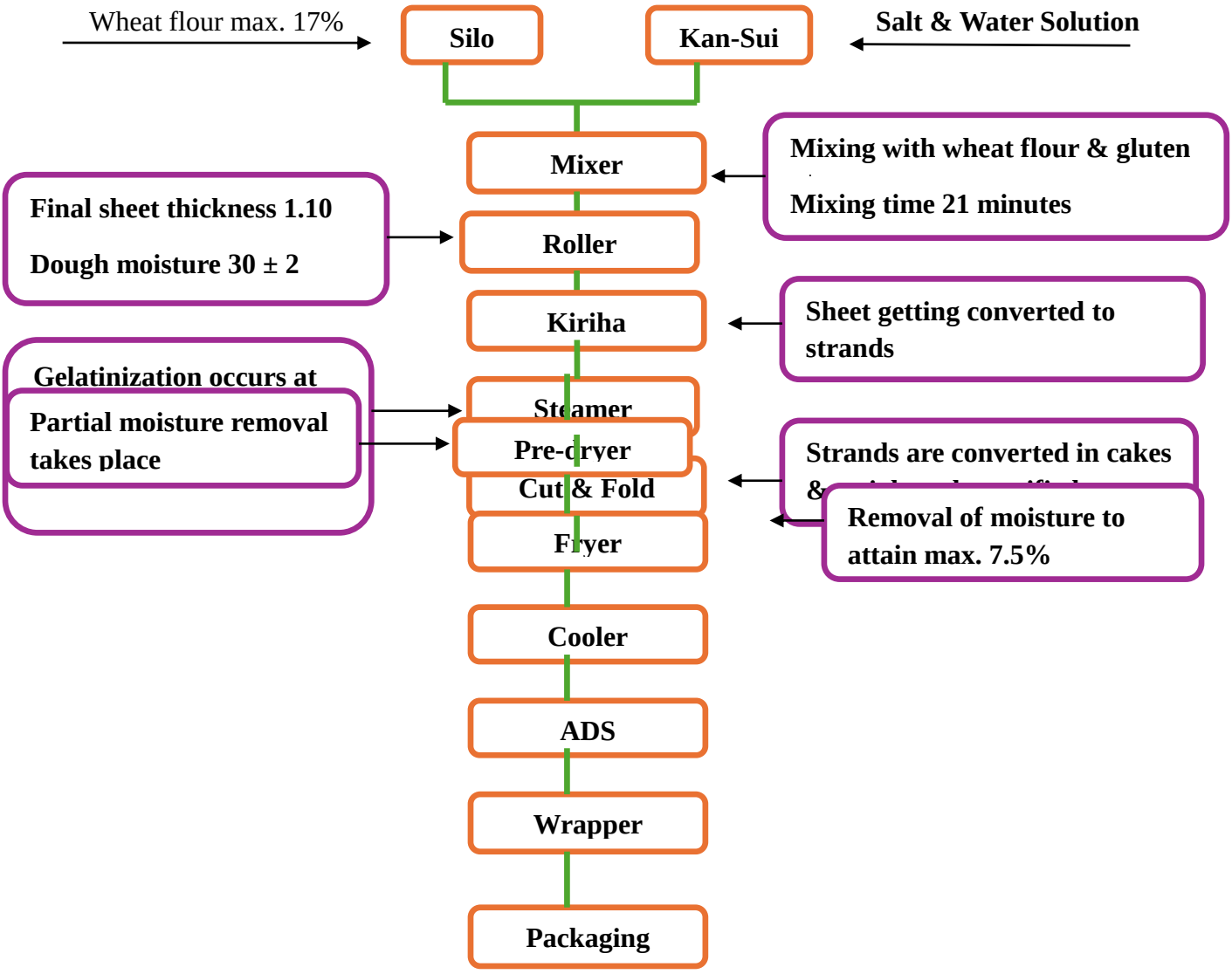
9. IP:

- Goal Alignment Compliance
- Analyzing the employee performance

- Leadership development

PRODUCTION PHASE - 1

Maggi Noodle Manufacturing



OPRPs

OPRP	Step (Inspection Point)	Control Measure (Inspection Characteristics)	How (Inspection Method)
OPRP 1	Wheat Flour Silo	Passing all the wheat flour from intact	Check the intactness of sieve

OPRP 2	Nylon cloth (40 mesh)+Duplex filter 2mm	Passing all the Kan - sui solution from intact Duplex filter 2.0 mm	Check the intactness 2 mm sieve
OPRP 3A	Mixer	1) Monitor holding time of the dough in the event of line stoppage 2) Miser scrapping/cleaning to avoid Staphenterotoxin& Bacillus cereus toxin formation	1) Monitoring of dough holding time in miser during line stoppage- Max 240 min (from the start of line stoppage to consumption) at ambient conditions
OPRP 3B	Dough Feeding Hopper	1) Monitor holding time of the dough in the event of line stoppage 2) Feeding Hopper scrapping/cleaning to avoid Staphenterotoxin& Bacillus cereus toxin formation	1) Monitoring of dough holding time during line stoppage- Max 240 min (from the start of line stoppage to consumption) at ambient conditions. 2)a. Feeding hopper scraping at 3rd b. Deep cleaning at 10th day Mã day
OPRP 4	Recycle Pdt. (Dough Sheet & Steamed Noodle)	Control storage time of recycled product	1) Monitor Cut Speed at Cut Fold 2) Fryer temperature (Process value) recorded on a continuous recorder/manually every 60 mins in Fryer logsheet
OPRP 5	Frying	Monitor frying temperature and time of frying	1) Monitor Cut Speed at Cut Fold 2) Fryer temperature (Process value) recorded on a continuous recorder/manually every 60 mins in Fryer

			logsheet
OPRP 6	Metal Detector	Passing all the cakes through validated Metal Detector	Check by passing the standard test place in with noodle cake. The metal detector should detect and reject the contaminated noodle cake.
OPRP 7B	Wheat Flour Silo, Wheat Gluten, Cold Mill rework, Recycle Product	1. Variant to be checked for each laminate roll before usage. 2. Variant to be checked for pouches at defined frequency	1. Visual check during every change of laminate roll and/or change of variant 2. Visual check of variant on pouches
OPRP 8	Transfer to Bulk Packing	Passing cakes from validated Metal detector and ensuring MD's challenge test is done in the shift	Check by passing the standard test place in with noodle cake. The metal detector should detect and reject the contaminated noodle cake.
OPRP 9	Offline MD at work for passing noodle chipping	Checking functioning of metal detectors (Defection & Rejection)	By passing 1.5 mm 55 test piece

RAW MATERIALS USED IN NOODLE PROCESSING-

1. Wheat Flour-

   The quality of the noodle depends not only on the processing conditions but also on the quality of the flour used. Wheat flour constitutes about 80% of the noodle cake so, consideration of quality requirements for this material is highly important.

The quality parameters of wheat flour serve as an important criterion for obtaining desired finished product quality and better processability/ line performance.

List of wheat flour vendors are-

- Himangi foods
- Shiv Shakti foods
- Tirupati foods
- Golden foods
- Shri JRG foods
- Bhawani foods
- Ambe foods
- Olam foods

2. WATER FOR KANSUI-

   One of the main focuses regarding water quality in kansui is the concentration of essential components present in the water, such as gases, organic materials, and minerals. Minerals like iron, calcium, and magnesium found in water seem to lead to uneven hydration of flour during mixing and sheeting processes. Soft water is used in noodle process with total hardness of water < 5 ppm.

   At Nestlé, demineralized water is utilized for steam boiler feed, necessitating strict control over its total dissolved solids, conductivity, and overall hardness.

3. KANSUI-

   Kansui is a mixture of various salts and water designed to achieve a specific standard for noodle preparation. The salts used are :

   - Sodium Chloride- Mainly used for flavor enhancement and provides bounciness to the final product.

- Potassium Chloride- Instead of regular salt, it is used at a level that doesn't cause bitterness during taste testing, effectively lowering the overall sodium content since common salt contains sodium.
- Sodium polyphosphate- Acts as a buffering agent by stabilizing pH of kansui.
- Sodium & potassium bicarbonate- Enhance the firmness, particularly when using low-protein or lower-quality flour, by combining chloride and carbonate.
- Guar-gum- Provides good water binding properties and provides greater resilience to dough.

4. FRYING OIL-

   Refined, Bleached, and Deodorized (RBDO) Palm Oil is used because of its stability and widespread availability. Due to its high content of saturated fatty acids (approximately 50%), palm oil enhances the stability of the final product.

   Palm oil typically solidifies at temperatures ranging from 33 to 39°C. As a result, it must be warmed to above 40°C before use to make it easier to manage.The high frying temperature evaporates the water content in the dough and dries the noodle.

5. REWORK-

   Products that do not meet recommended specifications and cannot be consumed the same day need further processing before use. This process is known as rework. Examples include rejected cakes during packaging and cakes with high moisture content. Reworked products are treated as ingredients and must be approved before use. Dry milled rework is recommended, with particles sized between 0.5 to 0.6 mm, up to a maximum of 4% or 5% based on dry weight.

6. RECYCLE-

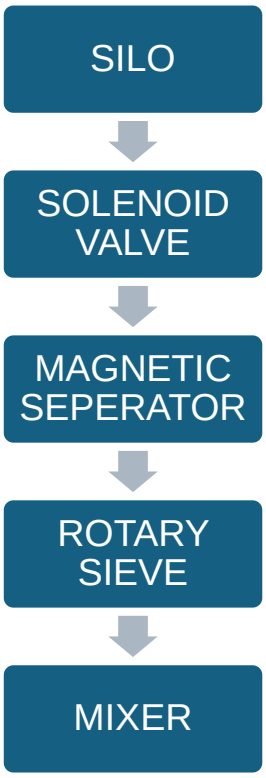
   Products that do not meet recommended specifications but can still be consumed within eight hours are classified as recycle material dough and dough sheets.

NOODLE PROCESSING AREAS-

1. **SILO-**

   A silo is a structure used for storing bulk materials. Flour is stored in silos having a capacity of 40 tonnes with a set point of 20-25 tonnes. For phase-2 silo no 5,6,7 and 8 is used for the respective lines.

   - Ground floor is having all the silos rotary sieves and magnetic separators.
   - The first floor is kept for calibration.
   - The second floor is having jet filter secondary filter which is used for wheat flour unloading.
   - The third floor is having reverse jet filter secondary filter which is used for debagging.



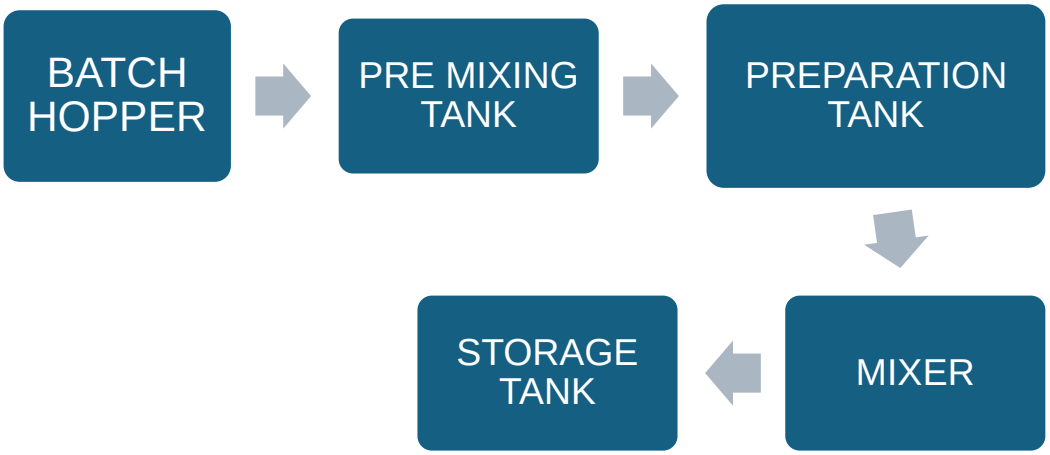
2. KANSUI

Kansui also called as salt solution has a ph of about 10-11 and a specific gravity of 1.05-1.09 kg\l.Kansui is added to the mixer which moves to the mixer through following steps:

- Batch Hopper- It is used for feeding salts to the premixing tank. A dust collector is attached to the top of the hopper for collecting the dust particles and excess air from the salts. The dust collector is
- attached with an induction motor.
- Premix tank- It is used to premix the solution with the help of DM water the agitators are attached in middle and a motor operates it. The capacity of the premixing tank is 1200L. Centrifugal pump is used to pass the prepared solution to the premixing tank.

- Preparation tank- It is used to prepare a homogenous kansui solution so that the salts mix properly with water with the help of agitators attached with it. Capacity of the preparation tank is of 8000 L. There are two tanks for preparation.
- Storage tank- Tank 1, 2 & 3 is used for storage. Filters used here are of conical filter with sieve size of 2 mm. Magnetic separator which is of rod type is used and duplex filter, having cylindrical sieve of 2 mm, nylon cloth of 40 micron for filtering is used.

  The prepared kansui is passed through and is stored in the storage tank to reduce the temperature of the kansui.



3. MIXER

Dough Mixing is a process where wheat flour and other dry ingredients are mixed with kansui solution to form uniformed dough in a stainless-steel mixer.

Processing at mixer-

o The mixer batch hopper capacity is 800 kg.

o Ingredients that are used in the mixing is wheat flour, kansui, gluten, rework & recycle.

o Two mixers for one noodle line are used which ensures continuous supply of dough to the roller.

o Water addition can be done in case of wheat flour moisture is less than 14.5%.
o Shelf life of recycle product is maximum of 4 hours.
o Dough moisture after mixing should be 28.5% to 31.5%.

MIXING TIME (21 min)

Dry Mixing	1 minute	90 Hz	Gluten, cold milled, no dough formation.
Kansui dosing	4 minute	60 Hz	Dull Yellow
Wet mixing	16 minute	50 Hz	Recycle +Dough sheet, 12-25 mm, dough balls form, continuous mixing

- Dry Mixing- Water is added and mixed with flour. The color of mix turns dull, and volume increases slightly due to water absorption by the flour. There is no dough formation at this stage.
- Kansui Dosing- Kansui is fully absorbed by the ingredients and dough formation is initiated withslight change in color.
- Wet Dosing- Volume of dough is reduced and small balls of 10 to 15 mm in size are formed. Dough looks drier than in the second stage.

4. ROLLER

Sheeting is a process wherein the dough is passed through a series of rollers to obtain a final sheet of desiredthickness which will then determine the noodle strand thickness.

- ❖ Total 10 rollers are present. Work of first two rollers is to make sheet these two sheets called sheet forming rollers.
- ❖ Third roller is called combining roller which works to combine both the sheets.
- ❖ Next 7 rollers work is to decrease the thickness of the sheet.
- ❖ Final sheet thickness should be 1.1 ±0.03 mm.

- ➢ **SLITTER\ KIRIHA-**

  The slitter/cutter called “kiriha” consists of a pair of grooved cylinders which cut and separate the dough sheet into strands that are trapped in the grooves.

  The work of kiriha is to form the strands from the sheets. Kiriha is identified using a specific number which refers to the number of stands produced in 30 mm of the length of kiriha.

  Noodle waves are formed inside the wave forming box that is attached to the kiriha.

5. STEAMER

- The purpose of steaming is to gelatinize the starch in order to eliminate the raw and doughy taste on the end product. Steaming time and temperature along with steam pressure are key process parameters that affect product quality.
- The minimum steaming time recommended is 120 seconds for noodle strand cooking and proper gelatinization

- About 85% of gelatinization occurs during steaming process.
- The temperature of steam is 100 ± 1 degree Celsius and pressure is 0.12 bar.
- Total time in steaming is 120 ± 5 seconds.
- Steamed cake moisture is about $31 \pm 1\%$.
- Frequency of checking the cake moisture of steam noodles is once per shift.
- Time required- 17 minutes, (checked once per shift).

6. PREDRYER

- Predrying is done in three stages. All predryer blowers must be working and temperature of drying should be 90 degree Celsius.
- Pre dried cake moisture should be in the range of 22-26% not more than 26%.
- Time required- 17 minutes, (checked once per shift).
- Sample of 3gm at temperature of 13 degree Celsius.

7. FRYING PROCESS

- Frying is a process wherein moisture from cakes is removed to a desired level and doughy taste is eliminated in the end product. Steamed or pre-dried noodle cakes are conveyed to the fryer buckets which pass through the hot oil bath.
- During frying, the water evaporates, and oil enters into the noodles. The process makes the noodles slightly puffed which helps during water reconstitution.
- Depending on the steamed cake moisture, frying condition and dough recipe, oil absorption of noodle cakes varies from 13.9 to 17%.
- Frying temperature has a direct effect on the moisture ofthe cake.That is frying temperature high will have the cakemoisture low and frying temperature low will have the cake moisture high.

- Fryer’s oil level and temperature play a big role in fat uptake by the noodles.

8. COOLING CONVEYER

The cooler uses ambient air to cool down the cakes and the normal condition. The cake temperature after cooling is about 5 degrees Celsius less than the ambient temperature.

Final cake moisture check

- Collect sample of one cake after the cooling conveyor and let it be at normal room temperature
- It should be in the range of 6.5 to 7.5%
- Frequency of final cake moisture should be checked every 30 minutes
- A sample of 3 grams istaken and ridden on moisture analyzer.

9. AUTOMATED DIVERSION SYSTEM (ADS)

ADS is incorporated at the end of the process line to reduce chippings,space and manpower. ADS is installed for orderly distribution of every row of cakes to respective wrapping or packaging lines.

10. WRAPPING AREA

Wrapping area is where all the manufactured cakes are packed. Total 13 wrappers are present in Phase 2.

LINE	NUMBER OF WRAPPERS	TYPE OF PACKAGING
5	4	LANGEN

6	5	MANUAL
7	4	LANGEN

11. **CUT OPEN & REWORK AREA**

All cakes which are rejected by the check weigher due to underweight or overfill are again cutand opened by operators and separated for bulk packaging or rework.

STEPS FOR CUT OPEN

- Pick up the packet then cut and open it with the help of cutting tool
- Separate out laminate in bags
- Store the good cakes in crates and send them to bulk or rework area
- Separate the contaminated taste maker cakes in hope bag for cattle feed

Components of noodle wrapping and packing area

Cake Channelizer -For small noodle line, channelizer is installed to transfer the noodle cakes toward the wrappers one after another. Division of the cakes depends on the number of packing machine. The flow of cakes is controlled by adjusting the channelizer tray length and conveyor belt speed. The whole objective is to align the cakes for packing conveyor

Automatic Distribution System Channelizing systems are becoming the past as Automatic Distribution System (ADS) is incorporated at the

end of the process line to reduce chippings, space and manpower. ADS is installed for orderly distribution of every row of cakes to respective wrapping or packaging lines.

Metal detector-To accept and then reject metallic particle in cake the working principle of metal detector is Faraday's law of electromagnetic induction it works on the proximity sensor. Industrial metal detectors and metal detector systems can safely detect in reduce metal contamination from production lines to help manufacturers achieve compliance, minimize risk of product recalls and reduce production down time.

Packing Conveyors and Collection trays Cakes coming from the channelizer are guided to the packing machines by the packing conveyor. These conveyors are normally made of slat conveyor belts. The packing conveyors run from the channelizer exit to the metal detector and then continue to run until the cake feeder.
Pneumatic diverters are installed on the packing conveyors to divert noodle cakes whenever the packing line stops. Cake collection is done at the exit of the diverter using collection trays, tables and so on. Chipping generation occurs at packing conveyor as the cake transfers from one conveyor to others. Therefore, well-aligned transfer chutes are installed for smooth movement of cakes from channelizer to packing and other conveyors. This will reduce the impact on the cakes, hence less chipping generation

This will reduce the impact on the cakes, hence less chipping generation. Nevertheless, some amount of chipping generation is inevitable due to the nature of the cake and therefore, chipping collection trays are installed along the sides and bottom of the packing conveyors. These are reworked to reduce line losses. The whole objective is to handle the cakes gently to minimize the breakage which will have effect on net weight and rework generation.

Auto cake feeder - it is a manpower used to feed extra kicks to conveyor belt in blank space. The man power also separates out dimensionally rejected cakes for rework use

Diverter a man power used to divert the cake coming from cooling conveyor so that the wrapper is done in correct position.

sachet dispenser a type of machine used to feat tastemaker above the cake they have different types of proximity sensors for different purposes

Filling Machine

It is used to feed laminate for packing of cake we have to reel holder ruler for holding laminate one tightener for each reel holder

One reel guiding roller for cach roller to splicing roller to slice the second laminate over the first one

when the first one is consumed the other rulers are laminate feeding rollers o unipolar to give a particular direction of feeding and supporting the other feeding roller forming box for giving a particular dimension to the cake packet according to the MPI rollers help to maintain long sealing edge dimension And selling roller 1 and 2 used for long sealing of packet

Batch coding of the product is done online. Various methods of coding are available, hot stamping or ink jet spray. Due to cost and low maintenance, the hot stamping method is preferred.

Jaw cutters-

Job heater used to give required temperature for end sealing. We use slip rings to give continuous electrical supply to the electrical heater's sensors placed here are in Domino coding and injaw cutting position

Sachet Detector

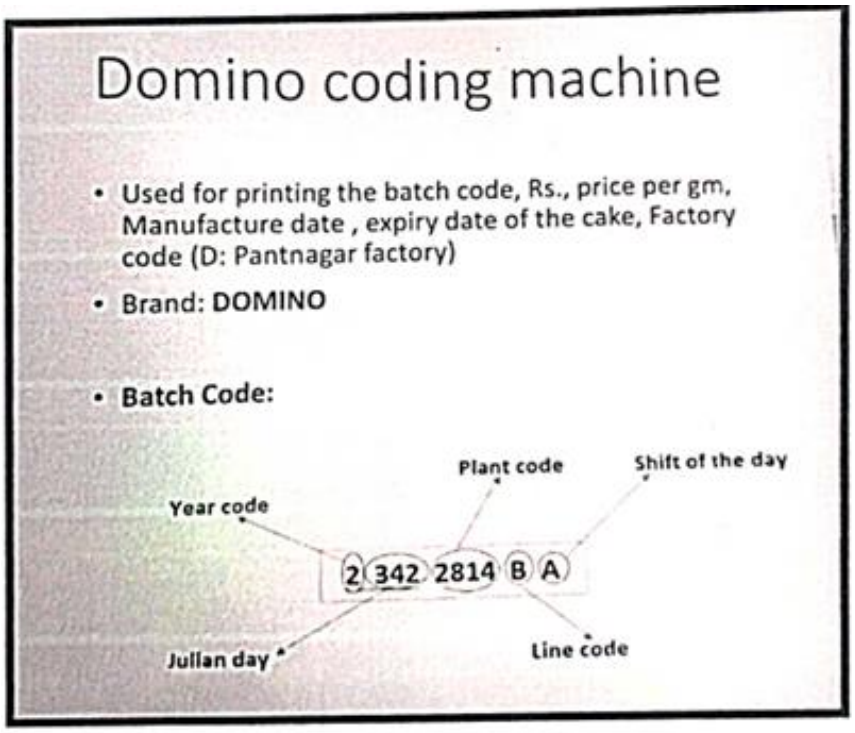
It is a type of proximity sensor used to detect the test maker in the packet the pneumatic gun used to reject the packet in which maker is not present. To minimize consumer complaints, it is mandatory to install a sachet detector at the exit of wrapper to sort out the packs without tastemaker sachet that can be caused by error on the dispenser. The scaledpack is passed through a sachet detector to check the presence of tastemaker sachet in each pack. Normally, the sachet detector detects the aluminum foil present in the laminate of the tastemaker sachet and lets the pack pass onward for case filling or multi-packing before case packing. If the tastemaker is not present in the pack, the metal detector activates a solenoid valve, and the pack is pushed out from the line with the help of compressed air. For multiple sachets (including nylon sachets), improved sachet detection is recommended to minimize missing sachet complaints.

Slip rings

It comprises of a metal ring and brush contact which is made up **of** graphite brass or copper and usuallyruns on the outer diameter of the metal ring it is an electromagnetic device that allows the transmissionof power and electrical signal from a stationary to a rotating structure. In our factory we use them forgiving continuous electrical supply to jaw heaters for maintaining their temperature within range.

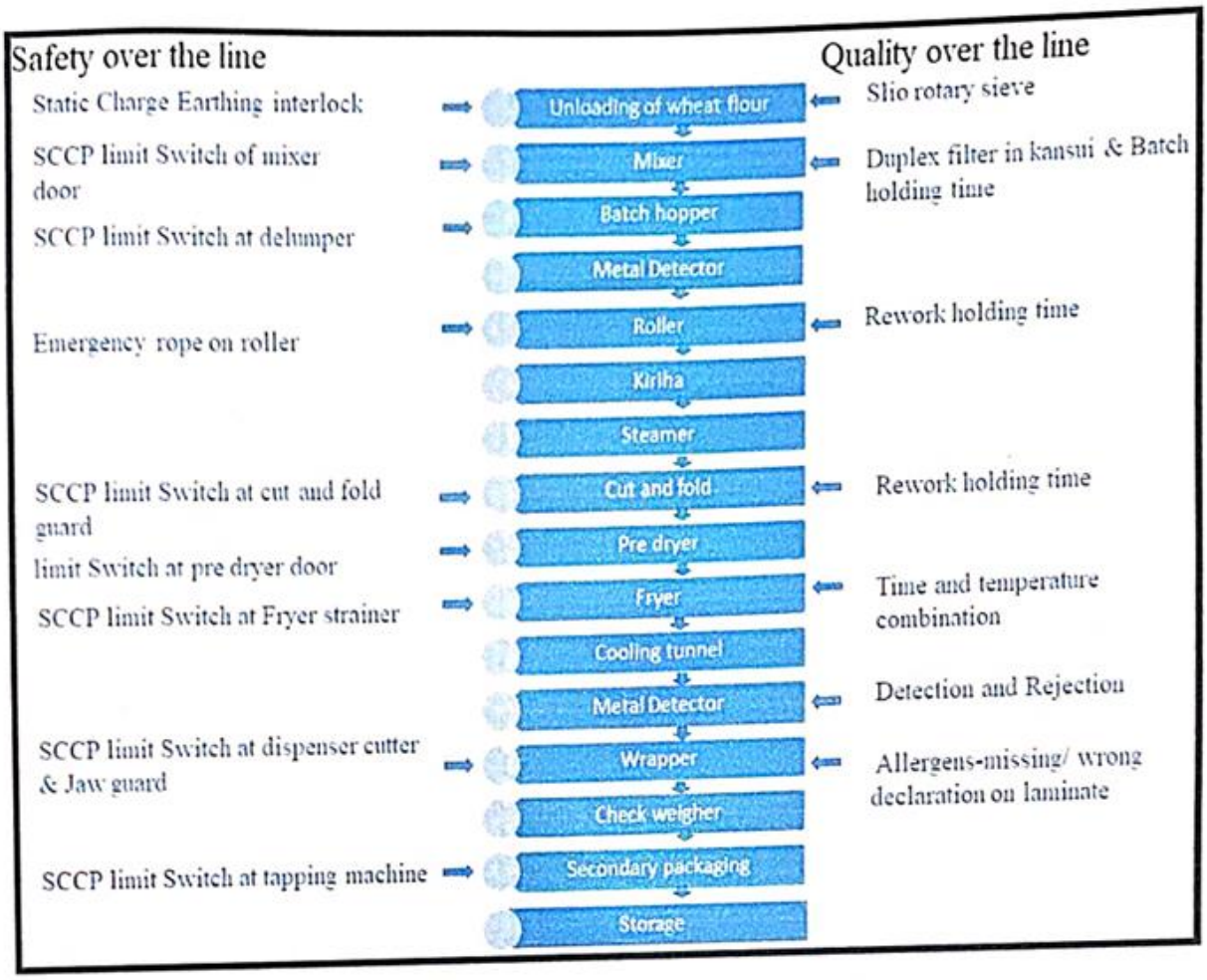
Load cell

It is a force gauge with consists of a transducer that is used to create an electrical signal whose magnitude is directly proportional to the force being measured that types of load cell are pneumatic hydraulic transducer capacitance. In our factory we use dynamic strain gauge.

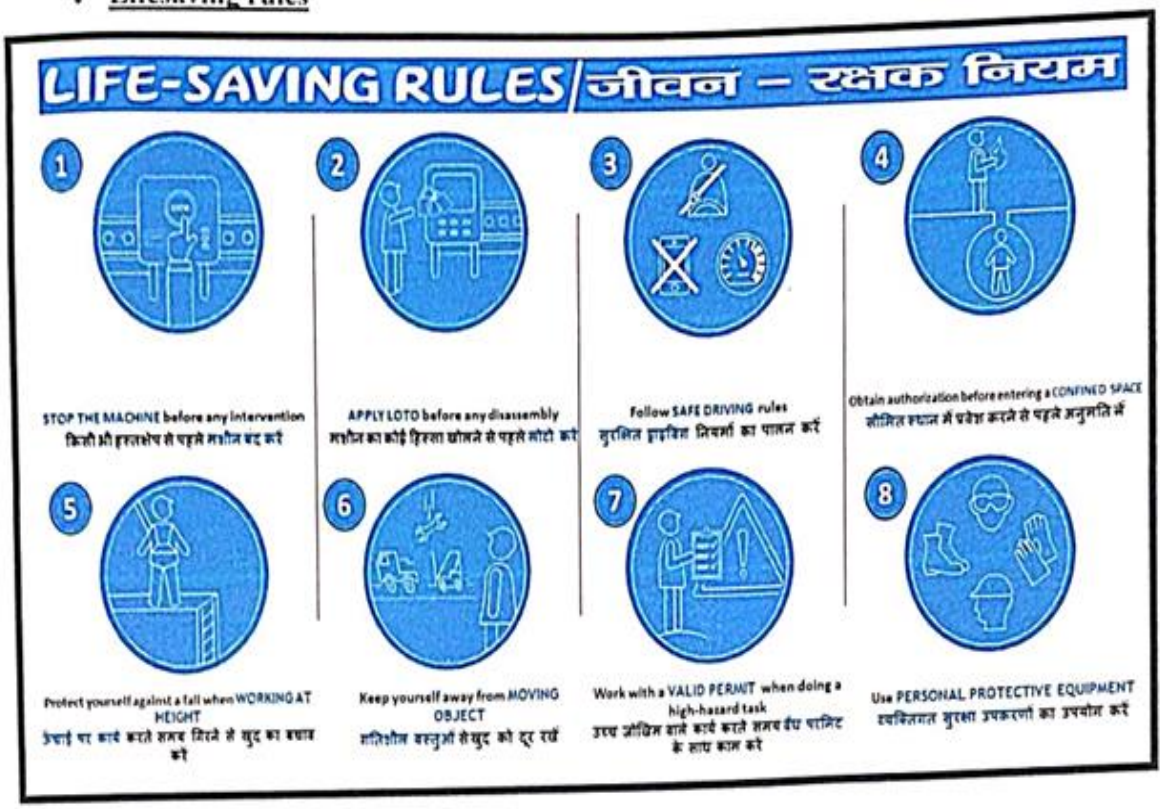


Domino coding machine

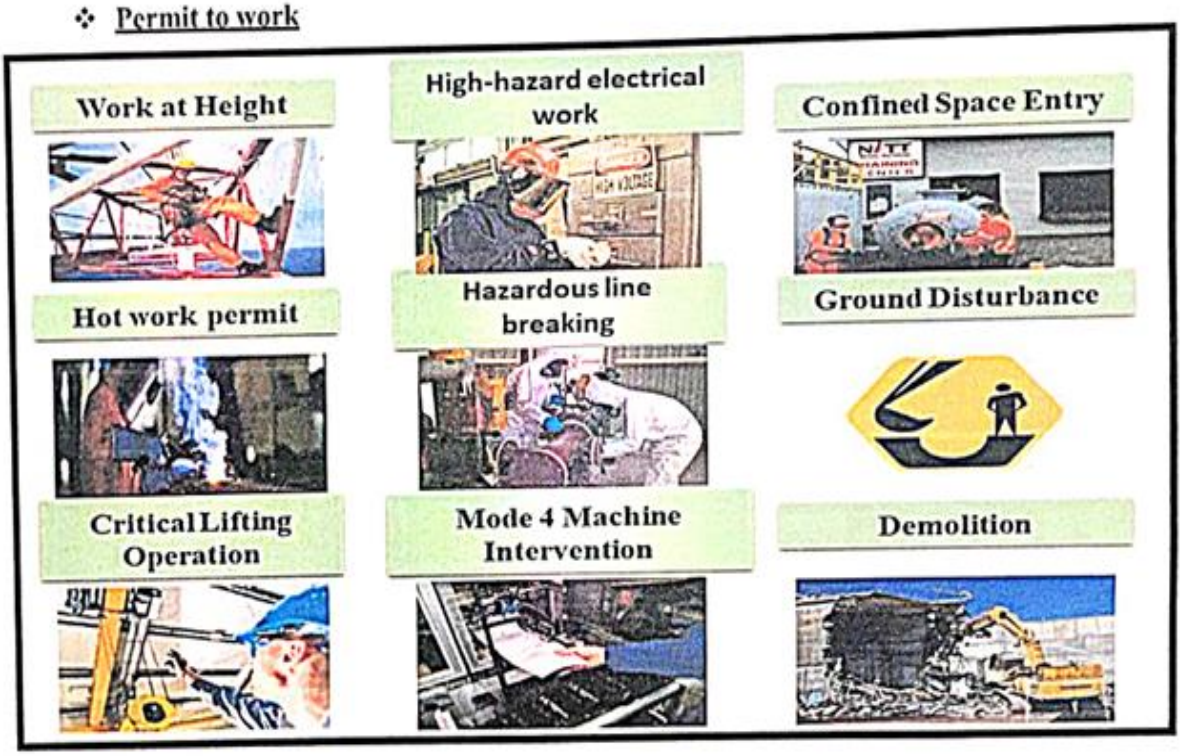
Safety and Quality over the lines

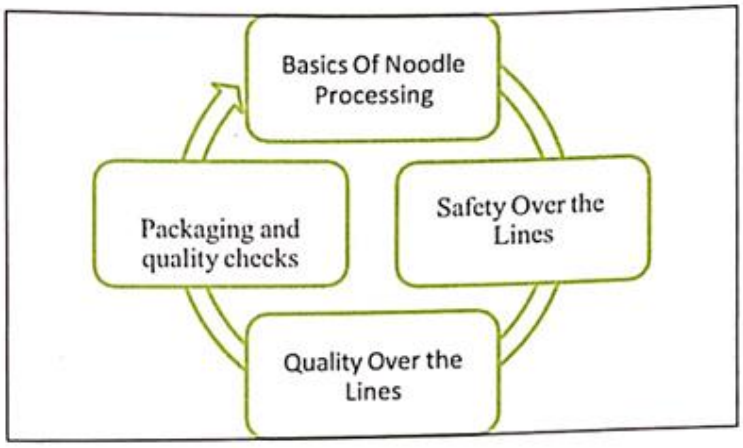


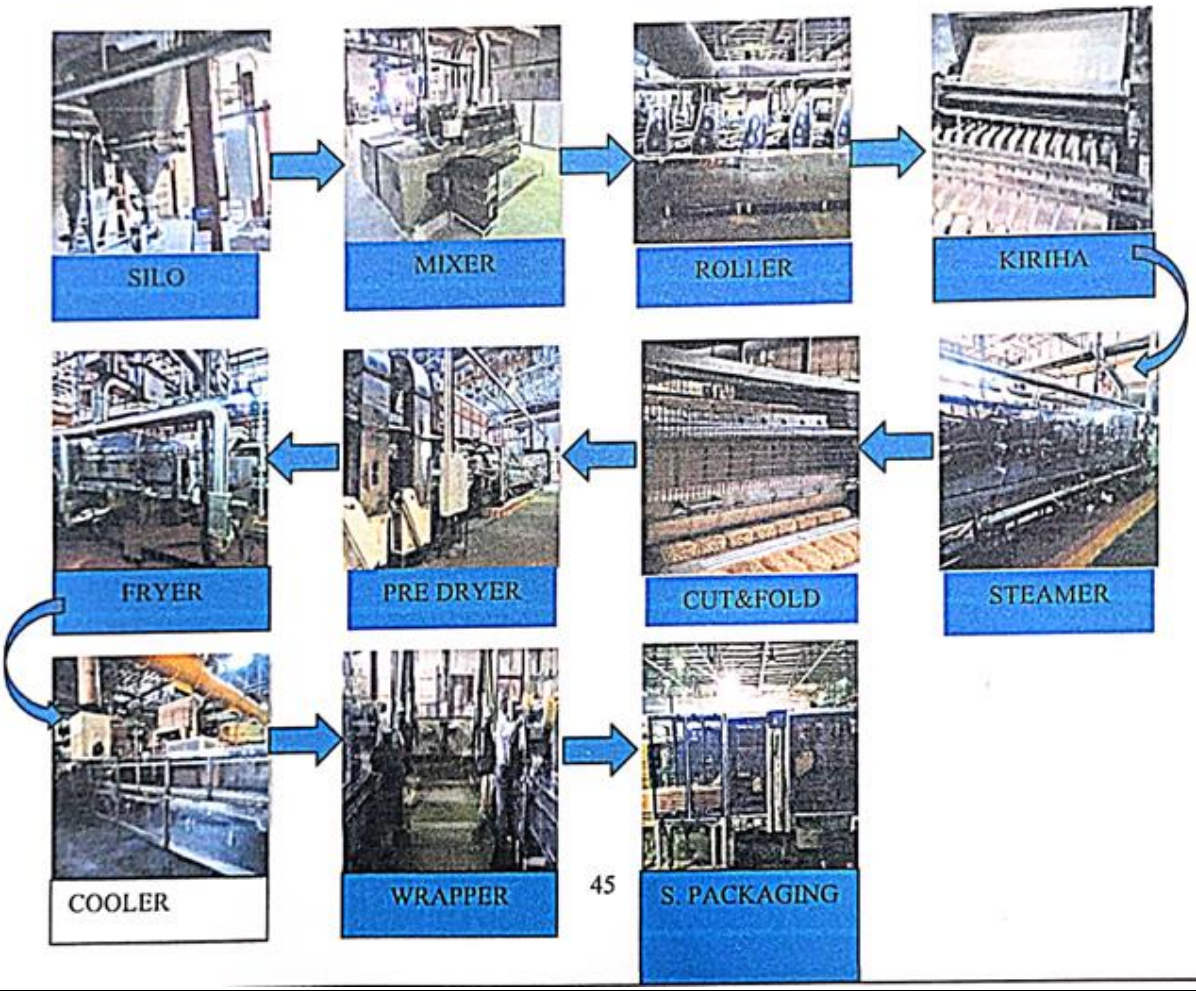
❖ **Lifesaving rules**



❖ **Permit to work**




Basics Of Noodle Processing
Safety Over the Lines
Quality Over the Lines
Packaging and quality checks


SILO
MIXER
ROLLER
KIRIHA
STEAMER
CUT&FOLD
PRE DRYER
FRYER
COOLER
WRAPPER
S. PACKAGING

Near Miss Project

Objective-

Modify the process of recycling plastic laminate.

Specified Outcome-

- To reduce the number of vehicles used in the transportation of the shredded plastics.
- To increase the density and intrinsic value of the end product.
- Achieved the above outcomes without compromising the safety of the workers

Proposed Idea-

There are many ways to address this problem but in our case in which we are dealing with different types of plastics used in our laminates. The best and safest option will be a Agglomerator which will increase the density of our laminate. This not only reduced the transportation cost but also it will also reduce the carbon emission into the environment which could be a great initiative in achieving Sustainability.

Average cost of the machine	2,40,00 INR
Electricity used per year	29.8 kw
Total	

The cost saved in the Transportation	1,20,000
The increased cost of the by product after processing	2,50,000 – 3,00,000
Total	

Derailed

The project derailed in achieving acceptance due to the requirement of government licence for recycling plastic in the factory.

Project Topic : Minimizing Waste in Noodle Production

Objective:

To minimize the waste generated during the process of noodle production.

Introduction:

Noodles are widely enjoyed staple food across the world. They consist of diverse elements such as proteins, starch and dietary fiber. They come in various forms fresh wet, dried, semi- dried, instant etc. each categorized based on their ingredients and preparation techniques.

The preparation of standard fried noodles involves the mixing of wheat flour, kansui in a batch mixer. Next the dough is rolled out into sheets, converted into strands and cooked through steaming. After steaming, noodles are immersed in hot oil for deep frying followed by cooling to room temperature and finally are packed along taste maker sachet.

Problem Statement:

The waste generated from overfilling and underfilling Maggie packets, along with frequent disturbance in the wrapper that leads to improper sealing of the product that result in more waste. Finding the best solution to decompose waste in save and sustainable manner.

.Waste Oil from the Fryer

After frying the noodle the waste oil generated from the Lines are 220 kg per day. In current scenario the waste is taken to the scrap yard, where they add 3 percent detergent to the waste oil to eliminate the future possibility of using it in food and sell it off to the vendors which used it cosmetic products.

The most sustainable way to decompose waste oil into useful product is converting it into biodiesel.

Biodiesel from Waste Oil

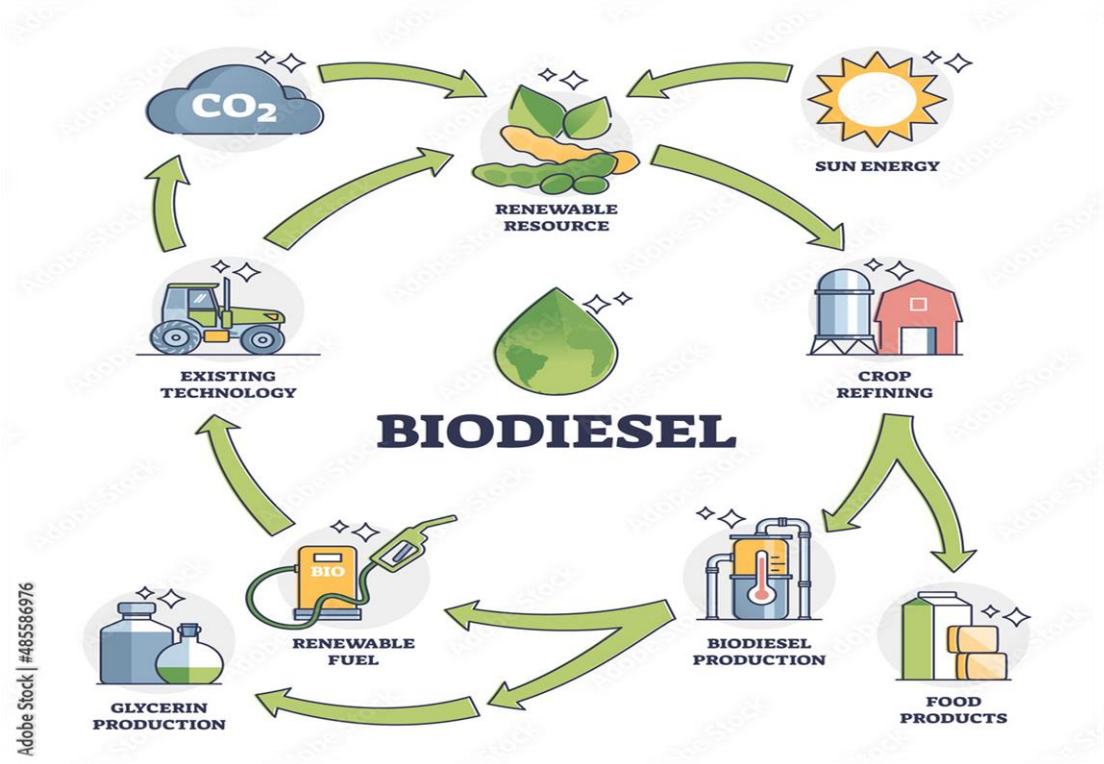
Biodiesel is a renewable, biodegradable fuel that can be produced from various feedstocks, including waste oil. Utilizing waste oil, such as used cooking oil, to produce biodiesel offers an environmentally friendly solution to both waste management and energy production.

The process of converting waste oil into biodiesel involves a chemical reaction called transesterification. This reaction uses an alcohol (commonly methanol) and a catalyst (such as sodium hydroxide or potassium hydroxide) to convert triglycerides in the waste oil into methyl esters (biodiesel) and glycerol as a byproduct.

Waste Reduction: By repurposing waste oil, it reduces the environmental burden of disposing of used cooking oils, which can otherwise ontribute to pollution.

Lower Emissions: Biodiesel burns cleaner than petroleum diesel, producing fewer greenhouse gases and pollutants, such as sulfur dioxide, particulates, and carbon monoxide.

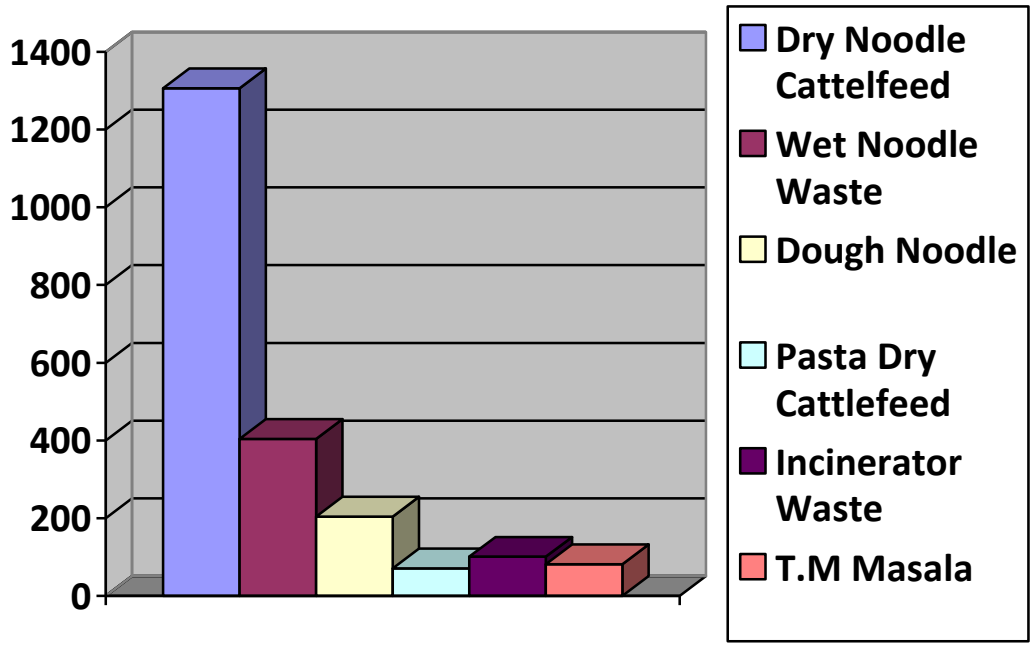
Sustainability: As a renewable resource, biodiesel from waste oil helps decrease dependence on fossil fuels and supports sustainable energy initiatives.

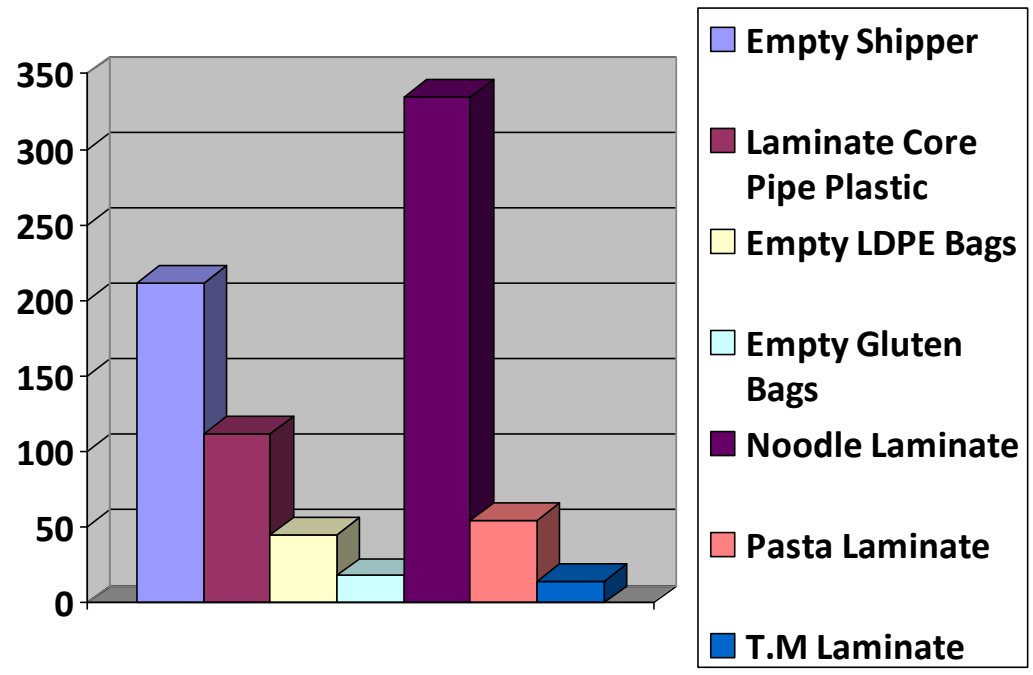


Result

After discussing this matter with the finance department we have came to conclusion that we should sell our waste oil generated in the factory to biodiesel manufacturer. The production of biodiesel from waste oil demonstrates significant progress towards sustainability. It addresses critical environmental issues, promotes efficient resource use, enhances energy security, and provides economic benefits, making it a valuable component of sustainable development strategies this will be a great initiative in achieving overall sustainability.

Laminate & Solid Waste





The above data is the average waste produced in kilograms.

Overfilling and Underfilling in a noodle-making factory can significantly contribute to increased waste, impacting both the environment and the business's bottom line. Here's a detailed conclusion on the implications of these issues:

Material Waste:

Overfilling:

Excess Product Usage: Overfilling packets leads to the use of more raw materials than necessary. This not only increases the cost of production but also depletes the supply of ingredients more quickly.

Packaging Waste: Overfilled packets might require additional or stronger packaging to accommodate the extra weight, leading to increased use of packaging materials.

Rejected Products If overfilled packets exceed weight regulations or packaging constraints, they may need to be discarded or reprocessed, resulting in further waste.

Underfilling:

Product Discard: Underfilled packets often fail to meet quality standards or weight requirements, leading to their rejection and disposal.

Customer Dissatisfaction: Consistently underfilled packets can lead to customer dissatisfaction and returns, contributing to waste as these returned products may not be reusable.

Financial Impact:

Increased Production Costs

Raw Material Costs: Overfilling increases the cost of raw materials as more product is used per packet than intended.

Operational Costs: Reprocessing or disposing of overfilled and underfilled packets incurs additional labor, energy, and operational costs.

Revenue Loss:

Product Recalls and Returns: Underfilling can result in product recalls or returns, leading to direct revenue loss and additional costs associated with handling and processing these returns.

Brand Reputation: Persistent issues with product fill levels can damage brand reputation, leading to decreased customer loyalty and reduced sales over time.

Environmental Impact:

Increased Waste Generation:

Landfill Burden: Discarded overfilled and underfilled packets contribute to landfill waste, increasing the environmental footprint of the factory.

Resource Depletion: Excessive use of raw materials due to overfilling contributes to faster depletion of natural resources.

Energy and Resource Wastage:

Manufacturing Energy The energy used in producing, packaging, and potentially reprocessing overfilled and underfilled packets is wasted if these products are discarded.

Water and Utilities: Additional water and utility usage for cleaning and reprocessing adds to the environmental burden.

Operational Inefficiencies:

Production Line Disruptions:

Frequent Adjustments: Constantly adjusting the filling machines to correct overfilling and underfilling issues can disrupt the production flow, leading to inefficiencies and downtime.

Machine Wear and Tear: Over time, these frequent adjustments and the handling of rejected products can lead to increased wear and tear on machinery, resulting in more frequent repairs and replacements.

Quality Control and Compliance:

Regulatory Non-Compliance:

Weight Regulations: Products that do not meet weight specifications can lead to regulatory non-compliance, resulting in fines and legal issues.

Quality Standards: Consistently failing to meet quality standards can result in audits and stricter regulatory scrutiny, impacting overall factory operations.

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Factors Affecting Overfilling and Underfilling

- If sheet thickness increases, if sheet thickness increases, then fat will decrease but if thickness increases then it will cause increase in weight of the cake.
- Compactness should neither be less nor be high. In both cases fat will increase so balance is important.
- If GSM of sheet increases, then fat uptake will decrease.
- Wet batch will cause increase in fat uptake while dry batch will cause less in fat uptake, but a dry batch can cause underweight online.
- Increase in damaged starch content will cause excess fat uptake.
- If wheat flour particle size is lesser then fat uptake will increase
- More water addition in batches will cause higher fat uptake in noodle cakes.
- Decrease in fryer temperature will cause high moisture content in final cake and vice versa.
- If the surface of cake strands is plain, then it will cause a decrease in fat uptake.
- If RH (Relative Humidity) of environment increases, then fat uptake on lines also increases.
- High dough moisture causes higher fat uptake and weight of the product.
- Higher pre dryer moisture will also cause increase in fat uptake. So, it is important to control the pre dryer moisture. For it, all pre dryer blowers must work properly.
- Higher oil level of fryer causes excess fat uptake, so it is very important to maintain the oil level of fryer.

All the air knives and heaters must be working properly so that oils could be removed from the final cakes.

Conclusion

We can see from the data that dry noodle waste is largest followed by laminate waste, the dry waste is converted into cattelfeed by adding three percent rice bran. Laminate waste is shredded and sells off to plastic vendor. The Waste can be reduced significantly if we address the issue of overfilling and underfilling. Overfilling and underfilling in a noodle-making factory lead to substantial material waste, increased production and operational costs, significant environmental impact, and potential damage to brand reputation. By addressing these issues through advanced technology, regular maintenance, employee training, and process optimization, factories can reduce waste, enhance efficiency, and improve overall sustainability. This not only benefits the environment but also leads to cost savings, better regulatory compliance, and higher customer satisfaction, ultimately contributing to a more profitable and sustainable business.

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KEY TERMINOLOGIES

- NQAC: Nestlé Quality Assurance Centre Moga
- NPQAL: Nestlé Pantnagar Quality Assurance Laboratory
- NABL: National Accreditation Board for Testing and Calibration Laboratories
- NRM: Nestlé Reference Material
- Q-Stat: Quality Statistics
- SOP: Standard Operating Procedure
- SAP: System Application Programme
- QMS: Quality Monitoring Schemes
- GLP: Good Laboratory Practices
- CQM: Corporate Quality Management
- SAR: South Asia region
- NQMS: Nestlé Quality Management System
- NCBP: Nestle Corporate Business Principles
- CoBC: Code of Business Conduct
- NMLP: Nestle Management & Leadership Principles
- CQAM: Corporate Quality Assurance Manager
- TAT: Turnaround Time
- QA: Quality Assurance
- QM: Quality Management
- HR: Human Resource
- DOR: Daily Operational Review
- TM: Tastemaker
- CQA: Corporate Quality Assurance
- RM: Raw material
- KPI: Key Performance Indicators