

INTERNSHIP REPORT

A COMPREHENSIVE TECHNICAL INTERNSHIP AT NESTLÉ INDIA FOCUSING ON PLANT-WIDE GASKET MAPPING AND
SAFETY IMPROVEMENTS FOR ROTARY VALVES

Company: Nestlé India, Pantnagar

Intern Name: Hardik Gupta

Institute: Indian Institute of Technology Jammu (IIT Jammu)

Department: Chemical Engineering

Year: 1st Year

Internship Duration: 19th May 2025 – 28th June 2025

Project Titles:

1. Plant-wide P&ID update for Gasket Management
 2. Rotary Valve Maintenance and Safety Review
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**IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE
OF**

BACHELOR OF TECHNOLOGY
(CHEMICAL ENGINEERING)

CERTIFICATE

This is to certify that Hardik Gupta student of B. Tech. Chemical Engineering, IIT Jammu (2024-2028), has completed the internship from 19th May, 2025 to 28th June, 2025 under our guidance and has submitted his Project Report.

It is certified that the contents given in this Project Report are true to our knowledge and belief. We hereby certify that his work is satisfactory and wish him all the success in the future.

ACKNOWLEDGEMENT

“Words have never expressed human sentiments. This is only an attempt to express our deep gratitude, which comes directly from the heart.”

I am glad to present this report. Preparation of this report is based on the coordination of so many people that it is very difficult for us to express our gratitude to them for their aid. However, I have tried my best to acknowledge thanks.

I am highly obliged to Mr Amarnath Gupta, who provided me the opportunity for this internship. I pay humble acknowledgement to Mr Chander Deep for his guidance to me during the internship and active encouragement, due to which I was able to complete my internship. I must express my thanks to Mr Shahnawaz Siddiqui, Mr Ajit Singh and Mr Munish Kaushik for their valuable inputs during my internship.

My heartfelt appreciation also goes to the operators who took the time to explain technical processes and made me feel like a valued member of the team. The knowledge and skills I have gained during this period have not only deepened my understanding of industrial operations but also instilled in me a greater sense of responsibility and discipline.

Hardik Gupta
B.Tech. 1st Year
IIT Jammu

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Executive Summary

This report details my internship experience at Nestlé India, where I worked on two primary projects across the entire manufacturing plant:

1. Plant-Wide Piping and Instrumentation Diagram (P&ID) Update for Gasket Management
2. Rotary Valve Maintenance and Safety Review

These projects provided critical exposure to large-scale documentation, process safety protocols, and mechanical integrity practices.

During the internship, I had the opportunity to explore a wide range of plant operations and develop insights into equipment functionality, engineering documentation, and industrial safety standards. I observed and interacted with several production lines and support systems. The first project focused on systematically reviewing and updating the plant's P&IDs to reflect the accurate positioning and types of gaskets used, which is essential for maintenance planning, leak prevention, and compliance with safety audits. The second project involved inspecting, analysing, and documenting maintenance practices and safety compliance measures for rotary valves used throughout the plant in various process units.

This experience significantly strengthened my technical understanding of industrial systems and enhanced essential skills such as analytical thinking, problem-solving, team

collaboration, and communication. The report elaborates on key project findings, methodologies followed, challenges encountered, safety practices implemented, and how the internship aligns with my long-term professional goals.

Introduction to Nestlé

Nestlé is the world's largest food and beverage company, headquartered in Vevey, Switzerland. Founded in 1866 by German-born pharmacist Henri Nestlé, the company initially gained prominence for producing an infant cereal that reduced infant mortality rates. Since then, Nestlé has grown into a global leader with over 2000 brands under its umbrella, operating in 189 countries. Its diversified portfolio spans categories such as dairy products, bottled water, coffee, frozen food, medical nutrition, pet care, cereals, and infant formula.



Figure 1: Image of Nestlé HQ

At the heart of Nestlé's philosophy is its commitment to improving lives. The corporate slogan, "Good Food, Good Life", reflects the company's mission to provide consumers with nutritious, safe, and tasty food products. Nestlé's global success can be attributed to its focus on scientific research, innovation, sustainability, and responsible corporate behaviour. It operates one of the world's largest private nutrition research organisations, with 23 R&D centres and over 5000 people dedicated to scientific advancement.

Nestlé India, the Indian subsidiary, has played a significant role in the domestic fast-moving consumer goods (FMCG) sector for more than 100 years. Headquartered in Gurgaon, Haryana, the company has nine manufacturing facilities and a vast distribution network across the country. Nestlé India's manufacturing footprint spans strategically across various states to optimise distribution and raw material access. The key plants are located in Moga (Punjab), Samalkha (Haryana), Nanjangud (Karnataka), Bicholim and Ponda (Goa), Choladi (Tamil Nadu), Tahliwal (Himachal Pradesh), Pantnagar (Uttarakhand), and Sanand (Gujarat). Each facility is specialised in producing different categories—ranging from dairy to confectionery—under strict quality and hygiene standards. These plants are equipped with modern technology and follow lean manufacturing principles to minimise waste and enhance productivity.

The organisation is structured to maintain high responsiveness to consumer demands and regulatory compliance. With over 7,000 employees across its operations, Nestlé India fosters a work culture centred around respect, integrity, collaboration, and continuous learning. It also promotes gender diversity, skill development, and local employment through training programmes and technical upskilling.

Nestlé India's supply chain is one of the most extensive in the country, enabling its products to reach even the remotest areas. The integration of digital systems in logistics and warehousing has further streamlined operations, ensuring timely and cost-effective delivery. The company is also investing in digitisation, AI, and automation to future-proof its operations. Its key product lines include Maggi instant noodles and pasta, Nescafé coffee, KitKat and Munch chocolates, Lactogen infant formula, Cerelac baby food, and Everyday dairy whitener. These brands have become household names and hold a significant market share in their respective categories.

In addition to its commercial success, Nestlé India is known for its focus on sustainability and environmental stewardship. The company has undertaken various initiatives aimed at water conservation, plastic waste management, and rural development. Through its Creating Shared Value (CSV)

strategy, it seeks to align business goals with societal needs in areas such as nutrition, water, and rural livelihoods.



Figure 2: Image of Nestlé Panthagar Factory

Nestlé's operations in India are marked by stringent quality control protocols, modern manufacturing practices, and an inclusive work

culture. My internship at one of Nestlé India's manufacturing plants gave me a valuable insight into these world-class operations. From understanding how continuous improvement and preventive maintenance are embedded into daily practices to observing the meticulous care taken in food safety and hygiene, the experience was eye-opening. It underscored how a multinational corporation can uphold high standards of quality and integrity while remaining sensitive to local market dynamics.

This enriching exposure helped me connect theoretical knowledge with practical implementation and offered me a deeper appreciation of the



Figure 3: Image 2 of Nestlé Panthagar Factory

complexities involved in managing large-scale industrial operations.

About the Plant / Manufacturing Process

Noodle Line

Maggi instant noodles have been a staple in Indian households for decades. The noodle line at the plant comprises seven parallel production lines designed to meet massive daily demand. The process begins in silos where refined wheat flour is stored. The flour is transferred to mixers where it is combined with kansui (an alkaline solution), gluten, and calcium carbonate to enhance elasticity and texture.

The dough is passed through a sequence of ten rollers which thin and laminate it. After the second roller, the two sheets are merged into a single continuous sheet, which continues to thin with each roller stage. This sheet is then steamed in a pre-cooker to gelatinise the starch, giving noodles their chewiness. After steaming, the



Figure 4: Dough roller system used in Maggi noodle production line at Nestlé India

sheet is cut into strands, shaped into cakes, and fried in Refined Bleached Deodorised Palm Oil (RBDO) at ~130°C.

Noodle Line

1. Flour Transport System
2. Kansui Tank
3. Mixer
4. Compound Rolling Machine
5. Continuous Rolling Machine

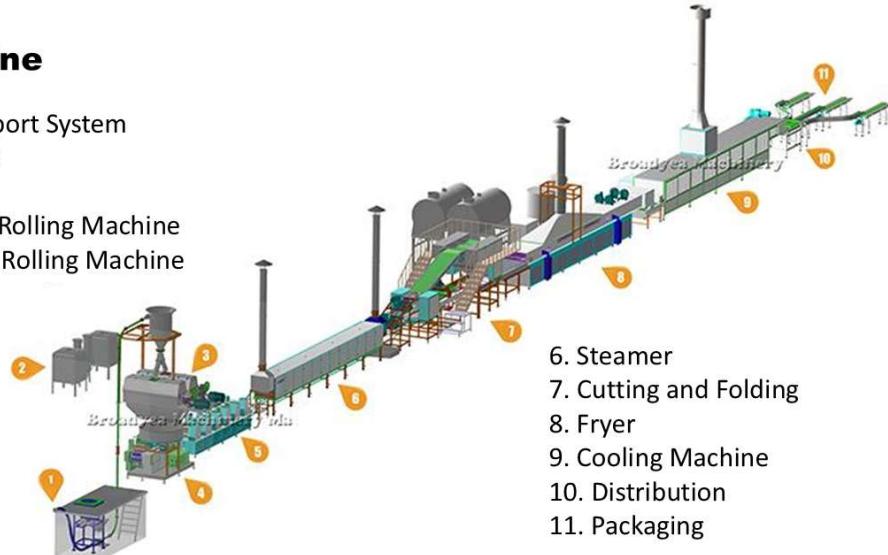


Figure 5: Image depicts the process flow in Noodle line

The cakes are then cooled via a chilled-air conveyor to bring them to room temperature before entering the ADS (Automatic Distribution System). This system includes hinge conveyors, aligners, sensors, and check weighers to ensure product conformity. Each cake is then individually wrapped and packaged.

Gaskets Used: In the noodle line, EPDM and food-grade PTFE gaskets are commonly used in steam lines, oil supply pipes, and pneumatic actuators. These gaskets ensure hygiene, thermal resistance, and leak-proof sealing during high-temperature frying and mixing operations.

Pasta Line



Figure 6: Image of the Pasta Production unit (from manufacturer)

The pasta line at the plant is designed to produce Maggi pasta variants in a highly controlled and automated environment. This line is equipped with a state-of-the-art pasta production and drying system

tailored for long-goods pasta production.

This line utilises traditional drying techniques along with high-temperature cycles to ensure consistent product quality. The system is divided into multiple zones for moistening, drying, and cooling, enabling accurate control over product moisture, texture, and shape retention. This line offers excellent production flexibility, energy efficiency, and robust performance.

Process Overview:

- Raw materials such as durum wheat semolina are mixed and hydrated to form a pasta dough.

- The dough is extruded through dies to achieve the desired pasta shape.
- The extruded pasta is passed into the dryer, which includes pre-drying, main drying, and final cooling zones.
- Moisture is precisely reduced in staged phases to avoid cracking or deformation.
- The dried pasta is then conveyed to packaging lines for sealing in moisture-resistant materials.

Gaskets Used: The pasta line uses **high-temperature resistant EPDM and PTFE gaskets** in the drying zones and extruder seals. These gaskets help maintain airtight conditions, prevent leakage, and ensure product safety during high-temperature exposure.

HPP (Hydrolysed Peanut Protein) Plant

The Hydrolysed Peanut Protein (HPP) plant at Nestlé is a dedicated facility designed to process groundnut cake into a flavour-rich protein hydrolysate. This ingredient is widely used in savoury products due to its umami profile and enhanced digestibility. The process integrates both enzymatic and thermal treatments and adheres to rigorous hygiene and allergen-control protocols.

Step-by-Step Process Flow:

1. Raw Material Preparation:

The process begins with **groundnut cake**, a by-product of oil extraction, which is mechanically ground into a slurry suitable for enzymatic hydrolysis.

2. Hydrolysis (6 hrs | 115–120°C):

The slurry is treated in a **hydrolyser** with acid (from the HCl day tank) and enzymes under controlled conditions. The high temperature aids in breaking down complex proteins into shorter peptides and amino acids.

3. Neutralisation (6 hrs | 80–90°C, TSS ~20%):

After hydrolysis, the acidic slurry is neutralised using caustic soda and **soda ash** through dosing from the caustic day tank. This balances the pH and stabilises the hydrolysate.

4. Intermediate Storage:

The neutralised slurry is held in a **neutraliser storage tank** to allow proper mixing and settling before further separation.

5. Solid-Liquid Separation:

The slurry is passed through a **filter press**, which separates solid residues. The solids are collected in a **sludge tank** with ~40% Total Suspended Solids (TSS).

6. Concentration (TSS ~80%):

The filtrate moves to a **balance tank** and is then

processed in a **concentrator/evaporator** to increase its solids content and reduce moisture, improving the efficiency of drying.

7. Vacuum Drying (6 hrs):

The concentrate is spread in trays and transferred to a **vacuum dryer** to remove moisture at low temperatures, preserving flavour and nutritional value.

8. Grinding:

The dried material is ground in a **hammer mill** to achieve a uniform powder consistency suitable for blending and packaging.

9. Packing:

The final hydrolysate powder is packed in moisture-proof packaging under hygienic conditions, ready for further use in seasoning or flavour formulations.

Process Chemicals & Controls:

- **HCl** (hydrochloric acid) and **caustic soda** are critical reagents dosed precisely through dedicated tanks and pumps.
- **Soda ash** is added to aid pH correction and improve protein structure post-hydrolysis.
- All tanks and pipelines are integrated with temperature and level sensors.

Gaskets Used:

- **PTFE and Nitrile Gaskets:** Found in hydrolyser vessels, filter presses, and vacuum dryers for thermal and chemical resistance.
- **Tri-Clamp Silicon Seals:** Used in CIP-friendly sections for food contact areas to ensure contamination control.
- **Viton Gaskets:** Occasionally used where aggressive cleaning solutions are employed.

Safety & Allergen Control:

- The HPP unit is treated as an allergen-sensitive zone. Dedicated PPE, segregated material handling systems, and validated cleaning protocols are followed.
- Documentation of traceability, sanitation, and chemical use is maintained to meet Nestlé's global food safety standards.

Vending Mix Plant

This section produces instant beverage mixes such as coffee, tea, and malted drinks, primarily intended for Nestlé's vending machine supply chain. It is classified as a high hygiene zone, emphasising air quality, material segregation, and cleanliness.

The plant includes **four major silos:**

- **Premix Silo:** Stores the base blend used in most vending products.

- **Coffee Silo:** For storing spray-dried or freeze-dried coffee.
- **Sugar Silo:** For bulk storage of refined, food-grade sugar.
- **EDW Silo (Encapsulated Dry Whitener):** Stores the non-dairy whitener used in tea/coffee mixes.

Each ingredient is pneumatically conveyed to the blending unit where proportional dosing is controlled electronically. After homogenisation, the product is passed through sieves and metal detectors to ensure uniformity and safety. Final packaging is carried out under controlled humidity using form-fill-seal systems that package the mix in sachets or pouches.

Gaskets Used: The vending mix plant utilises silicon and EPDM gaskets in pneumatic transfer lines, batch blenders, and packing machines due to their flexibility, hygienic properties, and resistance to fine powder abrasion and humidity ingress.

- Ingredients are weighed and pre-mixed.
- Blending is done in controlled blenders to ensure homogeneity.
- Final mixes are packed into single-serve sachets using form-fill-seal machines.

Gaskets Used: Silicon and EPDM gaskets are employed in mixers and packers to maintain hygiene and prevent air or moisture ingress.

Tastemaker Plant

The tastemaker is the iconic seasoning used in Maggi noodles. It contains spices, flavour enhancers, salt, and sugar blends.

Process Overview:

- Ingredients are batched using automated systems.
- Blending in ribbon blenders ensures a uniform spice mix.
- Homogenisation steps are used to improve flavour dispersion.
- The blend is sampled for sensory and analytical testing.
- Packaged in high-barrier laminates to prevent oxidation.

Gaskets Used: In this section, food-safe nitrile and silicone gaskets are used in dust-tight systems and bulk powder transfers. Antistatic gaskets are used where fine powder and static build-up are a concern.

Project 1 – Plant-Wide P&ID Update for Gasket Management

Importance of Gasket Management:

Gaskets are critical sealing components used across process piping, heat exchangers, pumps, and valves to prevent leakage of liquids, gases, or semi-solids. They ensure containment under high pressure and temperature conditions, maintain hygiene in food-grade systems, and

allow for disassembly and maintenance without damaging equipment surfaces.

Gaskets are made from various materials—such as PTFE, EPDM, Nitrile, Viton, and compressed non-asbestos fibre (CNAF)—each chosen based on chemical compatibility, pressure, and temperature resistance. In food manufacturing, especially under FSSAI and Nestlé safety standards, gaskets must comply with FDA regulations and be easily cleanable.



Figure 7: Different types of gaskets used in production

The typical life of a gasket varies depending on its type and operating environment. Silicone and EPDM gaskets used in hygienic zones may last 6–12 months, while PTFE or metal-reinforced gaskets in high-pressure systems may last longer if not exposed to cyclic thermal or mechanical stresses. Failures may result from:

- Overtightening or insufficient torque during installation
- Chemical incompatibility or absorption of media
- Thermal cycling and expansion
- Improper flange alignment or surface finish

Gasket failures pose serious risks—leakage, contamination, energy loss, equipment corrosion, or safety incidents such as steam or chemical exposure. Therefore, periodic gasket audits and accurate documentation (via P&IDs) are essential for preventive maintenance.

Objective:

The primary objective of this project was to update and validate the existing Piping and Instrumentation Diagrams (P&IDs) of the entire plant to ensure accurate representation and tracking of all gasket components. These updates were critical for enhancing maintenance protocols, improving plant safety, and ensuring regulatory compliance.

Background:

Gaskets play an essential role in preventing leakage and ensuring the mechanical integrity of piping systems. Over time, changes made during maintenance, retrofits, or expansions often lead to discrepancies between the actual field layout and existing P&IDs. Such inconsistencies can result in increased downtime, potential hazards, and inefficient preventive maintenance practices.

Methodology:

- **Familiarisation:** Began by understanding the structure and symbology of existing P&IDs used in the plant.
- **Plant Walkdowns:** Conducted thorough field verification of all units to identify and record gasket locations, sizes, types, and materials.
- **Data Collection:** Collaborated with maintenance and utility teams to gather input from previous maintenance logs and work orders.
- **Cross-Verification:** Matched physical observations with engineering documentation to flag outdated or missing components.
- **Draughting Revisions:** Marked corrections on printed P&ID sheets and proposed standardised annotation for gaskets.

Tools Used:

- Updated isometric drawings and standard P&ID legends
- Excel sheets for tabulating gasket counts and specifications
- Assistance from the Engineering Design department for final CAD updates

Key Deliverables:

- Updated gasket tagging system integrated into revised P&ID drafts
- Gasket inventory list categorized by line, size, and type
- Discrepancy report outlining gaps between actual and documented systems

Challenges:

- Accessibility of some gaskets in congested or high-risk zones
- Ambiguities in older P&ID versions requiring consultation with senior technicians
- Coordinating across multiple departments for holistic updates

Impact:

This project significantly improved the accuracy of the plant's documentation, streamlined future maintenance tasks, reduced safety risks, and laid the groundwork for a more

robust preventive maintenance framework. It also offered me deep insight into the practical importance of P&IDs and field alignment in real-world manufacturing operations.

Hypothetical Incident and Preventive Insight:

Scenario:

In a similar food processing facility, a high-pressure steam line gasket located near a noodle fryer ruptured during peak production. The failure led to a localized steam leak, which triggered an emergency stop and evacuation of the section. Investigation revealed that the gasket had been replaced six months earlier but was of an incompatible material and installed without torque guidelines. No injuries occurred, but production was halted for 4 hours, leading to losses and a negative audit remark.

Link to Project 1:

This scenario emphasizes the importance of material traceability and proper documentation. By mapping and updating over 4500 gasket entries during my P&ID validation project, I helped ensure that future replacements match design specifications. Adding a standardized annotation system also allows maintenance teams to quickly identify the correct gasket type, size, and installation torque, helping prevent such failures.

Outcome:

- Total gaskets initially mapped: **4476**

- Gaskets **added** in P&IDs: **126**
- Gaskets **removed** from P&IDs: **68**
- **Final number** of gaskets after assessment: **4534**
- Total **discrepancies corrected** in documentation: **159**. It also offered me deep insight into the practical importance of P&IDs and field alignment in real-world manufacturing operations.

Project 2 – Rotary Valve Maintenance and Safety Review

Technical Background on Rotary (Star) Valves:

Rotary valves—often called star valves due to their star-shaped rotor—are commonly used in food, chemical, and bulk solids industries for controlled feeding and discharging of powders or granules from silos, hoppers, cyclones, or pneumatic conveying systems. In Nestlé's manufacturing context, these valves are essential for metering products like flour, premixes, tastemakers, and sugar into processing or packing lines.

Each valve consists of a rotor housed within a tight cylindrical casing. As the rotor turns, material trapped in the rotor pockets drops out at the discharge point. This mechanism ensures a steady flow and also acts as an airlock, preventing pressure or contamination exchange between upstream and downstream systems.

There are various types of rotary valves:

- **Drop-through rotary valves** for gravity-fed material handling
- **Blow-through valves** for pneumatic transfer systems
- **Sanitary valves** designed with quick disassembly for cleaning in food processing

Failure Modes of Rotary Valves Include:

- Rotor wear and erosion due to abrasive powders
- Product leakage due to damaged seals or incorrect tolerances
- Motor or gearbox failure due to overload or lack of lubrication
- Air leakage affecting pneumatic conveying efficiency
- Build-up and contamination in poorly cleaned internals

Preventive maintenance is essential to ensure:

- Rotor clearance is within tolerance to avoid product bypass or metal-to-metal contact
- Seals and gaskets are intact and food-safe
- Proper lubrication of bearings and drives
- Timely inspection for material jamming or thermal damage

This project focused on not only auditing the current physical state of these valves but also identifying gaps in safety access control and helping standardize maintenance practices across departments.

Objective:

The primary objective of this project was to assess the condition, maintenance practices, and safety protocols associated with rotary valves used throughout the manufacturing plant. This included analysing their operation in various lines, identifying gaps in maintenance routines, and proposing improvements to ensure optimal functionality and enhanced worker safety.

Background:

Rotary (star) valves are critical components in many bulk material handling systems within food manufacturing plants. At Nestlé, they are used for controlled feeding of powders



Figure 8: Rotary Valve

and granulated ingredients between sections of the process, such as from hoppers to conveyors or mixers. Given their role, any malfunction can lead to material flow issues,

equipment wear, or contamination risks.

Methodology:

- **Identification of Rotary Valves:** Mapped all rotary valves across the plant, noting their location, application, and material handled.
- **Inspection:** Performed physical inspections to check for wear, leakage, alignment issues, and motor health.
- **Documentation Review:** Examined existing maintenance records, SOPs, and vendor manuals.
- **Interaction with Maintenance Teams:** Gathered insights on recurring problems, downtime records, and historical interventions.
- **Risk Assessment:** Evaluated safety measures in place including guarding, interlocks, and safe handling procedures during servicing.

Tools Used:

- Visual inspection checklists
- Digital photos and tagging for mapping
- Maintenance logs and machine history cards
- Coordination with Engineering and Safety departments

Key Deliverables:

- A compiled register of all rotary valves including make, model, and application
- Maintenance and wear condition report

- Proposed preventive maintenance schedule
- Suggested improvements in guarding and lockout-tagout (LOTO) procedures

Challenges:

- Some valves were located in enclosed or elevated areas requiring permits and PPE
- Lack of updated documentation for older units
- Coordinating inspections without disrupting production

Hypothetical Incident and Preventive Insight:

Scenario:

In a food manufacturing facility, a rotary (star) valve on a sugar discharge line was accessed for cleaning without proper authorization or isolation. The valve, which lacked a secondary tamper-proof bolt, was opened during a routine shift by a newly assigned operator unaware of the live line status. This resulted in uncontrolled material spillage and exposure to rotating internal components. Although no injury occurred due to quick response, the incident led to a temporary halt in operations and a safety review audit.

Link to Project 2:

This hypothetical scenario illustrates the importance of mechanical access control and SOP enforcement. During my project, I identified similar lapses where star valves lacked tamper-proof bolts and formal exception approvals. My contribution—designing a specialized bolt and redrafting a

dedicated SOP—directly addressed these risks and supported safer equipment maintenance practices.

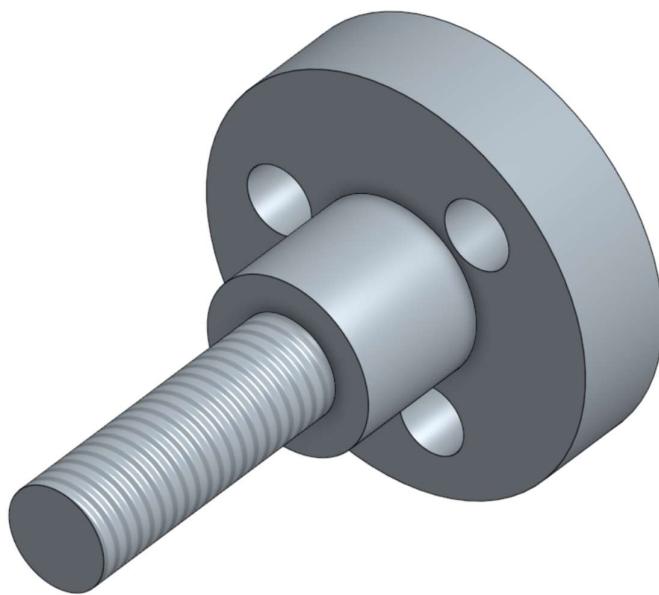


Figure 9: CAD model of the tamper-proof bolt for rotary valve access control

Impact:

The review enhanced the plant's readiness for predictive maintenance and improved valve life by identifying early signs of degradation. A critical observation during this assessment was that **some** of the rotary (star) valves in the plant lacked a **secondary access control mechanism**, specifically the **tamper-proof bolt system** that requires a specialized tool to open. According to Nestlé's safety protocols, such exceptions must be documented and approved by the SHE (Safety, Health & Environment) Manager, but these approvals were missing.

Upon identifying this gap, I collaborated with the factory's design engineer to **develop a new tamper-proof bolt** and a

matching specialized tool using AutoCAD. This design was proposed for retrofitting onto existing rotary valves and aligning with modern safety compliance. Additionally, I assisted in **drafting a new Standard Operating Procedure (SOP)** for the safe maintenance and handling of rotary valves. The SOP included clear guidelines on disassembly, inspection intervals, reassembly checks, LOTO implementation, and the mandatory use of the new tamper-proof bolt.

This intervention further strengthened safety compliance by emphasizing improvements in LOTO protocols and guarding systems. This project deepened my understanding of rotating equipment, safety engineering, technical documentation, and cross-functional collaboration in an industrial setting.

Safety Practices & Learnings

Safety is a top priority at Nestlé, and my internship offered firsthand exposure to the comprehensive safety systems and protocols embedded across all plant operations. From personal protective equipment (PPE) to procedural checks, every activity on the floor adheres to rigorous standards set by the company's Safety, Health, and Environment (SHE) policy.

Observed Safety Practices:

- **Mandatory PPE Usage:** Hairnets, gloves, safety shoes, and helmets were required in designated areas. Hygiene

protocols were strictly enforced, especially in high hygiene zones.

- **Permit to Work System:** Any work in confined spaces, at heights, or involving hot work required official permits and safety briefings.
- **Lockout-Tagout (LOTO):** Equipment was secured against accidental energization during maintenance using color-coded LOTO kits. I observed and followed this during my project work with rotary valves.
- **Emergency Drills & Signage:** Fire drills, mock evacuations, and availability of MSDS (Material Safety Data Sheets) in local languages were standard.
- **Toolbox Talks & SHE Briefings:** Daily safety briefings were held by line supervisors and SHE officers to raise awareness on ongoing hazards.

My Contribution:

During my project work, especially around star valves, I identified non-compliance related to secondary access control. This prompted a design solution and eventually led to the creation of a new tamper-proof bolt and SOP, both of which enhanced equipment-level safety.

Additionally, I attended safety walkthroughs, reviewed incident records, and shadowed safety audits to understand how real-time risk assessments are performed. These interactions enriched my understanding of proactive safety

culture and gave me practical tools to identify, communicate, and mitigate risks in industrial settings.

Skills Gained

My internship at Nestlé India provided me with a diverse range of technical and interpersonal skills that have enhanced my professional competence and personal growth.

Technical Skills:

- **P&ID Interpretation and Updating:** Gained proficiency in reading, analysing, and updating Piping and Instrumentation Diagrams (P&IDs), including tagging, equipment identification, and flow understanding.
- **AutoCAD Design:** Worked with the factory's design engineer to create a tamper-proof bolt and its corresponding tool, improving my proficiency in mechanical drafting and design communication.
- **Rotary Valve Inspection & Maintenance:** Learned the functional and maintenance aspects of rotary (star) valves including fault diagnosis, wear assessment, and documentation practices.
- **SOP Development:** Contributed to drafting a Standard Operating Procedure (SOP) that aligned with safety and operational standards for rotary valve maintenance.

- **Field Data Collection & Validation:** Conducted physical verification of gaskets and rotary valves across the plant, documenting findings with clarity and precision.

Interpersonal and Professional Skills:

- **Team Collaboration:** Interacted effectively with various departments including maintenance, SHE, engineering, and production to complete cross-functional tasks.
- **Problem Solving:** Demonstrated initiative in identifying safety non-compliance and proposing practical solutions in coordination with the design and safety teams.
- **Communication:** Improved both verbal and written communication through daily briefings, documentation, and report drafting.
- **Time Management:** Balanced fieldwork, documentation, and learning activities within tight project timelines.

This comprehensive exposure has prepared me for real-world industrial challenges and deepened my interest in engineering roles that demand both technical depth and cross-functional coordination.

Observations & Suggestions

During my time at Nestlé, I had the opportunity to observe plant operations, interact with multiple departments, and participate in improvement initiatives. This allowed me to

critically assess areas for optimization and reflect on operational strengths.

Observations:

- **Strong Safety Culture:** The SHE team and plant staff demonstrated a high level of commitment to safety, making it a visible and actionable priority across departments.
- **Integrated Manufacturing Processes:** Lines are highly automated and well-coordinated, supported by modern utilities and centralized control systems.
- **Documentation Discipline:** There is significant emphasis on maintaining accurate technical documentation, though some legacy systems still rely on older versions.
- **Proactive Cross-Functional Communication:** Departments work collaboratively to meet maintenance and production goals, especially evident during project walkthroughs.

Suggestions:

- **P&ID Digitization Initiative:** Although updates were made during my internship, transitioning to a fully digital P&ID database (with live linkage to asset tags and work order history) would enhance efficiency.
- **SOP Standardization and Auditing:** Periodic review and central storage of SOPs with traceable version control

would help ensure consistent adherence and audit readiness.

- **Retrofit Plan for Safety Enhancements:** A structured plan to implement tamper-proof bolts and other retrofit safety improvements across all applicable rotary valves should be considered.
- **Intern Orientation Module:** Developing a more formal onboarding program for interns covering layout, departments, key contacts, and SHE expectations would improve engagement from day one.

These insights, drawn from real-world exposure, highlight the value of combining technical precision with operational foresight in driving continuous improvement.

Glossary of Terms

- **P&ID** – Piping and Instrumentation Diagram
- **LOTO** – Lockout-Tagout (a safety procedure to ensure machinery is properly shut off)
- **CIP** – Clean-In-Place (a method of cleaning the interior surfaces of pipes and vessels without disassembly)
- **TSS** – Total Suspended Solids (used to measure the number of suspended particles in a liquid)
- **HPP** – hydrolysed Peanut Protein
- **EDW** – Encapsulated Dry Whitener
- **SHE** – Safety, Health and Environment

- **AutoCAD** – Software used for 2D and 3D computer-aided design and drafting
- **PTFE** – Polytetrafluoroethylene (a chemically resistant gasket material)
- **EPDM** – Ethylene Propylene Diene Monomer (a synthetic rubber used in gaskets and seals)
- **MSDS** – Material Safety Data Sheet
- **PLC** – Programmable Logic Controller (industrial digital computer used for automation)
- **ADS** – Automatic Distribution System (automated conveyor system for aligning and packaging noodle cakes)
- **SOP** – Standard Operating Procedure (a documented procedure that provides step-by-step instructions to ensure consistency and safety)
- **TQM** – Total Quality Management (a continuous improvement approach focused on quality across all processes)

Conclusion

My internship at Nestlé India was an invaluable learning experience that provided both technical knowledge and professional growth. Through my involvement in plant-wide projects like the P&ID update for gasket management and the safety review of rotary valves, I gained practical skills in process documentation, equipment maintenance, industrial safety, and cross-functional teamwork.

The opportunity to work on real-time challenges such as undocumented gaskets, missing tamper-proof mechanisms, and SOP development taught me how engineering knowledge can directly contribute to improving plant operations and worker safety. Moreover, exposure to industry-standard tools like AutoCAD, collaboration with experienced engineers, and participation in SHE protocols helped bridge the gap between academic learning and industrial application.

This internship has solidified my interest in industrial and process engineering roles, especially those that intersect with safety, reliability, and documentation. I am grateful for the guidance and opportunities provided during this period, and I am confident that the skills and insights I have gained will serve as a strong foundation for my future endeavours.

Thank You
