

“A Study of Traub Machine Operation, Drilling, Tapping and Grinding Processes in Automobile Component Manufacturing: A Case Study of Nikhil Industries Ahilyanagar.”

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Abstract

The automobile industry requires precision components with high dimensional accuracy, good surface finish, repeatability, and productivity. Various machining processes are used to manufacture automobile components according to their design and functional requirements. This research paper presents a case study of industrial work experience at **Nikhil Industries**, focusing on the operation of **Traub machines, drilling machines, tapping machines, and grinding machines** used in automobile component manufacturing. The study discusses the working principles, machining operations, operator responsibilities, quality inspection, common defects, safety practices, and methods for improving productivity.

The Traub machine is primarily used for automatic production of turned components, while drilling and tapping operations are used for producing holes and threads. Grinding is performed to achieve accurate dimensions and improved surface finish. The study indicates that proper machine setting, correct tool selection, regular inspection, tool-condition monitoring, and safe operating practices are essential for achieving consistent product quality. The integration of these machining processes provides an effective approach for manufacturing precision automobile components in production environments.

Keywords: Traub Machine, Drilling, Tapping, Grinding, Automobile Components, Machining, Production, Quality Control, Surface Finish.

1. Introduction

Automobile components require accurate dimensions and reliable quality because they are used in assemblies where interchangeability and proper functioning are important. Manufacturing industries therefore use different conventional and automatic machining processes to obtain the required component geometry.

At **Nikhil Industries**, machining operations include the use of Traub machines along with drilling, tapping, and grinding machines for automobile component manufacturing. The operator is responsible for machine operation, tool setting, component loading and unloading, dimensional inspection, and maintaining production quality.

The present study focuses on understanding these machining processes and the role of the operator in achieving efficient and consistent production.

2. Objectives of the Study

The major objectives are:

1. To study the operation of a Traub machine.
2. To understand drilling and tapping operations.
3. To study grinding operations used for automobile components.
4. To understand the role and responsibilities of the machine operator.
5. To study different cutting tools and machine tools.
6. To understand dimensional inspection procedures.
7. To identify common machining defects.
8. To study methods for improving productivity and quality.
9. To understand safety precautions during machining operations.

3. Overview of Machining Operations

The major operations considered in this study are:

Raw Material → Traub Machining → Drilling → Tapping → Grinding → Inspection → Final Component

The actual sequence may change depending on the component drawing and manufacturing requirements.

4. Traub Machine Operation

A Traub machine is an automatic turning machine used for the production of components in relatively large quantities. It can perform operations such as:

- Facing
- Turning
- Grooving
- Chamfering
- Drilling
- Threading
- Parting-off

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Fig 1. Traub Machine

4.1 Working Procedure

The general procedure is:

1. Select the required raw material.
2. Load the material into the machine.
3. Set the collet and work-holding arrangement.
4. Set cutting tools.
5. Adjust tool positions.
6. Set required machining dimensions.
7. Start the machine.
8. Produce the first component.
9. Inspect the first component.
10. Continue production after confirming dimensions.
11. Periodically inspect components during production.

4.2 Role of the Traub Machine Operator

The operator is responsible for:

- Machine setting

- Tool setting
- Raw-material loading
- Machine operation
- Tool-condition monitoring
- Component inspection
- Rejection identification
- Maintaining production records
- Machine cleaning
- Following safety procedures

5. Drilling Operation

Drilling is a machining operation used to produce a circular hole in a workpiece.

5.1 Main Elements

- Drilling machine
- Drill bit
- Workpiece
- Chuck
- Spindle
- Feed mechanism

5.2 Drilling Procedure

1. Select the appropriate drill according to the required hole diameter.
2. Secure the workpiece properly.
3. Mount the drill in the chuck.
4. Set the required spindle speed.
5. Apply suitable cutting fluid where required.
6. Start the machine.
7. Feed the drill gradually into the workpiece.
8. Remove the drill after achieving the required depth.
9. Inspect the hole diameter and depth.



Fig.2Drilling Operation

5.3 Common Drilling Defects

Defect	Possible Cause
Oversize hole	Drill runout or worn drill
Rough hole	Improper cutting condition
Hole deviation	Improper work holding

Defect	Possible Cause
Burr	Incorrect drilling condition
Broken drill	Excessive feed or improper alignment

6. Tapping Operation

Tapping is the process of producing **internal threads** inside a previously drilled hole.

6.1 Tapping Process

The general sequence is:

Drilling → Hole Inspection → Tapping → Thread Inspection

The drilled hole must have the appropriate tapping size before the tapping operation.

6.2 Tapping Procedure

1. Check the drilled hole.
2. Select the correct tap.
3. Secure the component.
4. Align the tap with the hole.
5. Start the tapping operation.
6. Apply suitable cutting fluid.
7. Maintain proper feed and speed.
8. Remove the tap carefully.
9. Clean the threaded hole.
10. Check the thread using a suitable thread gauge.

6.3 Common Tapping Defects

- Incorrect thread size
- Damaged thread
- Cross-threading
- Broken tap
- Incomplete thread
- Poor surface finish

Proper alignment and suitable tapping parameters are important for avoiding these defects.

7. Grinding Operation

Grinding is an abrasive machining process used for achieving high dimensional accuracy and surface finish.

Grinding may be performed after turning or other machining operations when tighter dimensional control or improved surface finish is required.

7.1 Main Elements

- Grinding machine
- Grinding wheel
- Workpiece
- Wheel spindle

- Work-holding arrangement
- Coolant system

7.2 Grinding Procedure

1. Inspect the workpiece before grinding.
2. Select the appropriate grinding wheel.
3. Check wheel condition.
4. Mount and dress the wheel if required.
5. Secure the component.
6. Set the required grinding parameters.
7. Apply coolant where applicable.
8. Perform grinding gradually.
9. Measure the component.
10. Confirm the required surface finish and dimensions.

7.3 Advantages of Grinding

- High dimensional accuracy
- Improved surface finish
- Ability to remove small amounts of material
- Suitable for hardened components
- Better control of final dimensions

8. Quality Inspection

Quality inspection is carried out at different stages of production.

Typical inspection instruments include:

Parameter	Measuring Instrument
Outside diameter	Micrometer
Length	Vernier caliper
Hole diameter	Bore gauge / Plug gauge
Thread	Go/No-Go thread gauge
Surface condition	Visual inspection / Surface measuring instrument
Grinding dimension	Micrometer
Component profile	Profile gauge

The first component produced after machine setting should be inspected before continuing large-scale production.

9. Common Manufacturing Defects

The following defects may occur during machining:

Traub Machine

- Incorrect diameter
- Incorrect length
- Burr formation
- Poor surface finish
- Taper
- Tool marks

Drilling

- Oversize hole
- Undersize hole
- Burr
- Hole misalignment
- Rough surface

Tapping

- Incorrect thread
- Cross-threading
- Broken tap
- Incomplete thread
- Damaged thread

Grinding

- Grinding marks
- Over-grinding
- Incorrect dimension
- Poor surface finish
- Burning of workpiece

Early inspection and proper process control can reduce these defects.

10. Productivity Improvement

Productivity can be improved by:

1. Proper machine setting.
2. Correct cutting-tool selection.
3. Regular tool inspection.
4. Timely tool replacement.
5. Proper work holding.
6. Reduction of machine idle time.
7. Proper material handling.
8. Standard operating procedures.
9. Regular dimensional inspection.
10. Preventive machine maintenance.

11. Importance of Operator Skill

The machine operator plays an important role in maintaining production quality. Operator knowledge is required for:

- Reading engineering drawings
- Understanding dimensions and tolerances
- Selecting tools
- Machine setting
- Measuring components
- Identifying defects
- Correcting minor process variations
- Following safety procedures

A skilled operator can identify abnormal machine sounds, vibration, tool wear, dimensional variation, and surface defects at an early stage.

12. Safety Precautions

Important safety precautions include:

- Wear appropriate PPE.
- Use safety shoes and eye protection.
- Do not touch rotating components.
- Never remove chips with bare hands.
- Use proper chip-removal tools.
- Stop the machine before making adjustments.
- Keep the working area clean.
- Do not wear loose clothing near rotating machinery.
- Check grinding-wheel condition before use.
- Use guards on grinding machines.
- Follow machine operating instructions.
- Report machine abnormalities immediately.

13. Results and Discussion

The study of Traub, drilling, tapping, and grinding operations demonstrates that different machining processes are interconnected in automobile component manufacturing.

The **Traub machine** provides efficient turning and automatic production. **Drilling** produces required holes, while **tapping** provides internal threads. **Grinding** can be used as a finishing operation where higher dimensional accuracy and surface quality are required.

The quality of the final component depends on several factors:

Machine Condition + Tool Condition + Correct Parameters + Operator Skill + Inspection = Quality Component

Regular measurement during production helps detect dimensional variation before a large number of components are rejected.

14. Suggested Data for Actual Research

For making this paper more research-oriented, the following actual shop-floor data can be collected from Nikhil Industries:

Parameter	Before Improvement	After Improvement
Production/day	—	—
Cycle time/component	—	—
Rejection/day	—	—
Tool life	—	—
Setup time	—	—
Grinding time	—	—
Drilling time	—	—
Tapping time	—	—

These values should be filled using **actual**

observations from Nikhil Industries, rather than estimated figures.

15. Conclusion

This study presents the practical application of **Traub machine operation, drilling, tapping, and grinding processes** in automobile component manufacturing at Nikhil Industries.

The study shows that Traub machining is useful for repetitive production of turned components, while drilling and tapping are essential for producing holes and internal threads. Grinding provides an important finishing operation for achieving the required dimensional accuracy and surface finish.

Proper machine setting, tool management, dimensional inspection, preventive maintenance, and operator skill are important for reducing rejection and improving productivity. The study also highlights the importance of following appropriate safety practices during all machining operations.

16. Future Scope

Future research can focus on:

- Optimization of Traub machine cutting parameters.
- Reduction of machining cycle time.
- Improvement of tool life.
- Reduction of rejection percentage.
- Application of **5S and Kaizen**.
- Implementation of **Poka-Yoke**.
- Statistical Process Control (SPC).
- Overall Equipment Effectiveness (OEE) analysis.
- Automation of dimensional inspection.
- Comparison of Traub and CNC turning processes.

17. References

1. Chera Machine Tools, "Automatic Lathe (TRAUB Machine)," information on automatic lathes, applications and production capabilities. [TRAUB Machine – Chera Machine Tools](#) citeturnsearch
2. INDEX TRAUB, "TRAUB TNL20 Sliding Headstock Automatic," technical information on TRAUB turning machines. [INDEX TRAUB TNL20](#) citeturn0image0
3. INDEX TRAUB, "TRAUB TNL32 Sliding Headstock Automatic," information on high-precision bar turning.
4. Haas Automation, "DS-40Y Dual-Spindle Y-Axis Turning Center,"

information covering turning, drilling and tapping operations. [Haas DS-40Y](#)

5. Mitsubishi Electric, *M800V/M80V Series Instruction Manual*, machining cycles including drilling and tapping.