

# **CNC ENGINEERING WORKSHOP**

## **1. INTRODUCTION:**

Precision machining facilities are crucial for ancillaries of primary manufacturers. Good manufacturing facilities for precision are hard to find in normal Engineering Workshops. Some units with precision machining and other facilities are able to serve industries for critical components. With focus, a CNC machine based Workshop can be established with specialized facilities like dynamic balancing, wire cut EDM machine etc. and other general purpose facilities viz. welding/ brazing /metallizing etc. facility.

## **2. PRODUCT & ITS APPLICATION:**

The precision jobs demand engineering workshop with highly skilled manpower and better machinery like CNC machine tools. The capability to execute precision jobs of either component manufacturing or repairs, depend on the facilities and man power team.

Precision Job work activities involve manufacture of parts like shafts and stems, industrial valves seats, gears, sprockets, dies and tooling for pharma, food, electronics, aerospace, defense etc. industries. Also compressor and turbine parts, chemical pump and agitator impellers, electric motor parts, medical equipment parts, auto parts like engine valves, tappets, camshafts, gears.

## **3. DESIRED QUALIFICATIONS FOR PROMOTER:**

Person is having Diploma or graduate in engineering and preferably having relevant experience.

## **4. INDUSTRY OUTLOOK/TREND**

Asia and especially India is expected to emerge as the largest manufacturing base for variety of mass produced components requiring precision for the world. After China, India is emerging as major industrial machines and Auto Industry. The vehicle production and growing vehicle population, in developing countries and improvement in the economic conditions, is leading to increasing investments by the industry players within the APAC region. In Asia, India has a very prominent place as a manufacturing base due to its size and population enabling mass production of products and components. If the auto sector alone is taken, it has expanded by 14.3 per cent because of strong growth in the spares or after-market sales to reach at a level of Rs 2.92 lakh crore (US\$ 44.90 billion) in the year 2017. The auto-components industry accounts for almost seven per cent of India's Gross Domestic Product (GDP) and employs as many as 25 million people, both directly and indirectly. Besides, this, industrial machine components and sub systems, white goods, building wares, plastic moulds and dies, hydraulic systems, electronic peripherals and automation systems etc require services of precision component manufacturing facilities viz CNC workshops.

At present, there are very few such CNC work shops, not more than 30 in number in large and small medium sector of various types component manufacturers for auto and white goods sector. The unit clusters are mainly located in North Indian centers like Punjab, Haryana, Delhi and West UP, in Maharashtra around Pune and Bombay and Southern India near Bangalore, Chennai and Hyderabad, in Gujarat around Ahmedabad, Rajkot and Surendranagar.

## **5. MARKET POTENTIAL AND MARKETING ISSUES. IF ANY:**

Apart from automobiles, air and gas compressors mining equipment, trucks, buses, trains, generator sets, forklifts, earth moving and material handling equipments, railways, Defence sector etc require CNC precision components. The demand is expected to expand at an average growth rate of 15%.

The project of Precision CNC machine based engineering workshop will serve the critical equipment industries. Depending on the location of unit, workshop can focus on job work to produce parts for machinery manufacturing industries. Auto and stationary engines, and industrial plants in the region around unit can be

serviced for all precision dies and tooling and other components. For aerospace, defense, chemical plants, pharma plant, textile industry, food, dairy, pulp, paper and packaging industry, etc.

CNC engineering workshops are established by industries in house to meet the need of precision machined components in India. However the new trend has been emerging to rely on ancillary units supplying components, while the major branded products manufacturers are focusing more on design, assembly & testing of final products and Marketing and servicing. The OEM in industrial machines and auto sector are now relying more and more on ancillary units among which a CNC workshop has always a good need for competent services of Precision machining and sheet metal component engineering work shop.

## **6. RAW MATERIAL REQUIREMENTS:**

The CNC machining job work entails the finish machining of cast or forged components for OEMs sourcing the materials for workshops. Besides ancillary units also offer components for job work. The unit mostly will not need the material for such work. However for special jobs including materials in small volumes viz. repair and rebuilding activities shall require several types of materials as per need like castings, forgings, steel rods and sections, plates etc. All are available in market or they are arranged by the customers.

## **7. MANUFACTURING PROCESS:**

The precision work shop can take up job work for parts like, I C engine valves, Industrial valve pump and turbine, valve seats, impeller blades etc., large diameter and high speed rotating machinery parts, automatic machine tooling and dies etc. that require close tolerances and complex geometric profiles.

There is component specific process sequence for job work and repair replacement and rebuilding activities. The most common processes carried out are turning, milling, shaping, special threading, grinding, lapping, gear shaping, metallizing and finishing.

## 8. MANPOWER REQUIREMENT:

The unit shall require highly skilled service persons. The unit can start from 5 employees initially and increase to 18 or more depending on business volume.

Sr. No	Type of Employees	Monthly Salary	No of Employees				
			Year 1	Year 2	Year 3	Year 4	Year 5
1	Skilled Operators	20000	2	4	6	6	6
2	Semi-Skilled/Helpers	7000	2	4	6	8	8
3	Supervisor/Manager	25000	1	1	1	1	1
4	Accounts/Marketing	16000	0	1	1	2	2
5	Other Staff	7000	0	0	0	1	1
	TOTAL		5	10	14	18	18

## 9. IMPLEMENTATION SCHEDULE:

The unit can be implemented within 6 months from the serious initiation of project work.

Sr. No	Activities	Time Required in Months
1	Acquisition of Premises	2
2	Construction (if Applicable)	2
3	Procurement and Installation of Plant and Machinery	2
4	Arrangement of Finance	2
5	Manpower Recruitment and start up	2
	Total Time Required (Some Activities run concurrently)	6

## 10. COST OF PROJECT:

The unit will require total project cost of Rs 104.24 lakhs as shown below:

Sr No	Particulars	In Lakhs
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1	Land	15.00
2	Building	35.00
3	Plant and Machinery	41.05
4	Fixtures and Electrical Installation	2.65
5	Other Assets/ Preliminary and Preoperative Expenses	2.50
6	Margin for working Capital	8.04
	<b>TOTAL PROJECT COST</b>	<b>104.24</b>

## 11. MEANS OF FINANCE:

The project will require promoter to invest about Rs 32.09 lakhs and seek bank loans of Rs 72.15 lakhs based on 70% loan on fixed assets.

Sr. No	Particulars	In Lakhs
1	Promoters Contribution	32.09
2	Loan Finance	72.15
	TOTAL:	104.24

## 12. WORKING CAPITAL REQUIREMENTS:

Working capital requirements are calculated as below:

Sr. No	Particulars	Gross Amount	Margin %	Margin Amount	Bank Finance
1	Inventories	2.52	40	1.01	1.51
2	Receivables	7.35	50	3.68	3.68
3	Overheads	2.35	100	2.35	0.00
4	Creditors	2.52	40	1.01	1.51
	TOTAL	14.73		8.04	6.69

## 13. LIST OF MACHINERY REQUIRED:

Sr No	Particulars	UOM	Quantity	Rate	Total Value
	Main Machines/ Equipment				

1	Hacksaw machine	Nos	1	80000	80000
2	CNC Lathe machine	Nos	1	600000	600000
3	Precision CNC Milling machine and all attachment	Nos	1	850000	850000
4	Heavy Duty Milling Machine	Nos	1	500000	500000
5	EDM Machine	Nos	1	900000	900000
6	Heavy duty Pillar Drill machine	Nos	1	300000	300000
7	Precision Grinding /threading etc. Attachments	Nos	1	250000	250000
8	Belt grinding Polishing machine	Nos	1	100000	100000
9	Welding Brazing set	Nos	2	80000	160000
10	Lapping machine	Nos	1	90000	90000
	Sub Total:				3830000
	Tools and Ancillaries				
1	Tools and gauges	LS	1	200000	200000
2	Misc. tools etc.	LS	1	75000	75000
	Sub Total:				275000
	Fixtures and Elect Installation				
1	Storage racks and trolleys	LS	1	15000	15000
2	Other Furniture	LS	1	20000	20000
3	Telephones/Computer	LS	1	30000	30000
4	Electrical Installation	LS	1	200000	200000
	Subtotal:				265000
	Other Assets/ Preliminary and Preoperative Expenses	LS	1	250000	250000
	TOTAL PLANT MACHINERY COST				4620000

All the machines and equipment are available from local manufacturers. The entrepreneur needs to ensure proper selection of product mix and proper type of machines and tooling to have modern and flexible designs. It may be worthwhile to look at reconditioned imported machines, dies and tooling. Some of the machinery and dies and tooling suppliers are listed here below:

1. Techno Machines

Chikkanahalli Road,  
Opp. Shahi Exports (Unit No 6),  
Near Annapoorneshwari Temple, Bommanahalli,  
BENGALURU-560 068, INDIA

2. S. S. Engineering Works  
Ajit Khanna(Proprietor)  
Plot No. 100, Sector 6 IMT Manesar, Gurgaon - 122050, Haryana, India
  
3. Taurus Private Ltd Co  
No. 24, D 2 / E 3, Kiab Industrial, Area At Pivele  
Kiab Industrial Area  
Bengaluru - 560100 Karnataka, India
  
4. Micro Engineering Works;  
No. 6/140, Gandhi Nagar, Nallampalayam Road Nanjai Gounden, Pudur, G. N.  
Mills Post, Coimbatore - 641029, Tamil Nadu, India
  
5. S. G. Profile  
Plot No. 201/1, Gala No. 56, Morya Industrial Estate, MIDC, Bhosari, Bhosari  
Midc,  
Pune-411026, Maharashtra, India

Other well known machine manufacturers can be searched from directories/  
internet. Some are listed here below:

ACME TOOLINGS, D-67, Phase 1, IDA Jeedimetla, Hyderabad - 500055,  
Ace Manufacturing Systems Ltd., Batliboi Ltd. Mumbai, Bharat Fritz Werner Ltd.,  
HMT Machine Tools Ltd., Advani Oerlikon Ltd, Bombay, Lakshmi Machine Works  
Ltd., Lokesh Machines Ltd., Praga Tools Ltd., Toolcraft Systems Pvt. Ltd. etc

The above list of machine supplier is illustrative. There are many machinery, dies  
and tools suppliers and consultants at several industrial clusters all over India  
where you may find suppliers of services and machinery for a chosen product mix.

Other well-known machine manufacturers can be searched from directories/ internet.

#### 14. PROFITABILITY CALCULATIONS:

Sr No	Particulars	UOM	Year Wise estimates				
			Year 1	Year 2	Year 3	Year 4	Year 5
1	Capacity Utilization	%	40	50	60	70	75
2	Sales	Rs Lakhs	44.10	55.13	66.16	77.18	82.70
3	Raw Materials & Other Direct Inputs	Rs Lakhs	15.10	18.87	22.64	26.42	28.30
4	Gross Margin	Rs Lakhs	29.01	36.26	43.51	50.77	54.39
5	Overheads Except Interest	Rs Lakhs	8.68	8.68	8.68	8.68	8.68
6	Interest	Rs Lakhs	10.10	10.10	10.10	10.10	10.10
7	Depreciation	Rs Lakhs	8.12	8.12	8.12	8.12	8.12
8	Net Profit Before Tax	Rs Lakhs	2.11	9.36	16.61	23.86	27.49

The basis of profitability calculation:

Unit will have capacity of providing Job Work services to ancillary units for specific components of up to 100,000 nos per year, depending on the type/ size of components and the complexity and nos of machining and other operations involved. For high precision components in small volumes and dies and mold components the capacity may vary. The average cost of Job work may depend on volumes and the range is taken as Rs. 100 pc for very large volume to Rs.5000 per piece for smaller volumes and multiple operations.

The material requirements are almost nil as cast and forged components are supplied by customers. One time toolings / wearing material costs is taken at market rates. The unit may generate wastage/ scrap which is to be sold at @ Rs 20 ~ 80 per Kg depending on type. The income of same is added. Consumables costs also considered based on prevailing rate.

Energy Costs are considered at Rs 7 per Kwh. The depreciation of plant is taken at 10 % and Interest costs are taken at 14 -15 % depending on type of industry.



## 15. BREAK EVEN ANALYSIS

The project is can reach break-even capacity at 37.01 % of the installed capacity as depicted here below:

Sr. No	Particulars	UOM	Value
1	Sales at Full Capacity	Rs Lakhs	110.26
2	Variable Costs	Rs Lakhs	37.74
3	Fixed Cost incl. Interest	Rs Lakhs	26.90
4	Break Even Capacity	% of Inst Capacity	37.10

## 16. STATUTORY/ GOVERNMENT APPROVALS

The unit will require state industry unit registration with District Industry center. No other procedures are involved. For export, IEC Code and local authority clearances. The industry registration and approval for factory plan, safety etc are required as per factory inspectorate and labor laws. Other registration are as per Labor laws are ESI, PF etc. Before starting the unit unit will also need GST registration for procurement of materials as also for sale of goods. As such there is no pollution control registration requirements, however the unit will have to ensure safe environment through installation of chimney etc as per rules. Solid waste disposal shall have to meet the required norms.

## 17. BACKWARD AND FORWARD INTEGRATION

The machines and equipment offer scope for diversification in to producing several consumer and industrial parts/ components and parts. The unit can utilize the spare capacities. As such there is not much scope for organic backward or forward integration. The entrepreneur needs to ensure proper selection of Job mix and also be careful in maintaining product parameters in terms of dimensions, tolerances and geometric profiles along with final weights of products.

The workshop business needs building up reputation, ensuring reliability and quality of services rendered. Also personal rapport of key persons can generate good business volumes from OEM units and ancillary component unit. The location with good catchment area ensures good market potential to new business units.

## **18. TRAINING CENTERS/COURSES**

There are no specific training centers for production technology. However foundry technology can be obtained by joining as apprentice in foundry units. The Prototype Development Centers can provide some assistance and for foundry technology, casting, machining, dies and Tools development, courses run by centers of excellence viz Indo German Tool Room at Ahmedabad, Rajkot, Chennai, etc shall be helpful.

The most important scope of learning is in new product design and development by study of the new product designs, product range, features and specifications of leading Brands / competitors across the world by scanning the Internet and downloading data from websites of Viz. North American, Europe, China etc markets.

Udyamimitra portal (link: [www.udyamimitra.in](http://www.udyamimitra.in)) can also be accessed for hand-holding services viz. application filling / project report preparation, EDP, financial Training, Skill Development, mentoring etc.

Entrepreneurship program helps to run business successfully is also available from Institutes like Entrepreneurship Development Institute of India (EDII) and its affiliates all over India.

### **Disclaimer:**

Only few machine manufacturers are mentioned in the profile, although many machine manufacturers are available in the market. The addresses given for machinery manufacturers have been taken from reliable sources, to the best of knowledge and contacts. However, no responsibility is admitted, in case any inadvertent error or incorrectness is noticed therein. Further the same have been given by way of information only and do not carry any recommendation.

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