

# **SCREWS & RIVETS**

## **1. INTRODUCTION:**

Screws and rivets are the hardware device that mechanically joins or affixes two or more objects together. Screws come in various shapes and designs to ensure the joining purposes in a variety of industrial applications. Rivets provide permanent joints. The shank is cylindrical that is plastically deformed to get the other end while joining. Both screws and rivets are used to join similar as well as dissimilar materials.

Before welding methods were perfected for permanent joining of metals in almost all applications viz. structures of bridges, boilers, ships, and rivets was the standard fastening technique.

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

Screws have a head and threaded shank. The head is formed to have 1.5 to 2 times the diameter of shank, and different shapes are formed for tightening and holding the screw in place. Shank threads are either cut or roll forged. Through tools like screw drivers etc., the screw is rotated and driven in to material to be joined viz. wood screws. Alternatively, the machine screws to join and hold metal parts may have a threaded hole to fit in screw. Friction of screw thread holds the joint. Alternatively, nuts with or without washers may be used to join.

Rivet is passed through holes of parts to be joined and the other end is formed in shape similar to head in-situ through plastic deformation. Riveting involves pounding to create a new "head" on the other end by smashing the "tail" material, resulting in a rivet that is roughly a dumbbell shape. Rivets of semi tubular or fully tubular are made to speed up the riveting process.

Screws and rivets are made with cold or hot forging. Industrial as well as housing sectors demand screws, nuts, bolts, and rivets for a variety of applications. These products are universal

joining materials as they increase the durability of the joined parts and can be used on different kinds of substrates such as wood, building materials, metals and plastics.

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

Any graduates with experience, preferably with mechanical/ metallurgical background.

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

The outlook of furniture industry prospects remains optimistic, mainly driven by the demand from construction, household remodeling, commercial etc sectors; due to recent economic and industrial policies and measures taken by government.

All types of fasteners except high tensile and special type of fasteners are reserved for SSI Sector. Most of fasteners units are located in large centers of Northern region, New Delhi and Gurgaon, Haryana, Southern area consisting of Chennai, Tamil Nadu and Bangalore, Karnataka. Western cluster encompasses Mumbai, Pune, Nashik and Aurangabad, and Rajkot Ahmedabad in Gujarat. Mild steel fasteners are primarily manufactured by the unorganized sector, while high tensile fasteners require superior technology and are dominated by companies in the organized sector.

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

Construction is projected to witness significant gains at a CAGR of over 6.5% for the coming five year period, on account of urbanization, population growth, and government infrastructural plan. Moreover, rapid growth in water, energy, transport, social and housing infrastructure, hospitals, schools, defense infrastructure, government accommodation, and natural resources will promote market growth over the upcoming years.

Screws and rivets are used in furniture and construction industry, packing cases, Electrical durable and appliances, instrumentation, white goods, wiring, railway carriages. In building construction work they are commonly used. The size of screws vary. The key driver for the

industry is the rising income and up gradation / remodeling of housing sector. Rising urbanization will cause huge demand from domestic products viz. Furniture industries use large quantity of screws and rivets.

These products are having potential both in domestic and international markets. As the demand of this item is increasing many new units can come up.

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

Screws and rivets are generally made from low to medium carbon steel wire rods. Other strong materials may be used for specific applications, such as stainless steel, alloy steels etc. as also nonferrous metals viz, brass, or aluminum alloy etc. Quality of the metal used is of utmost importance in order to avoid failures and cracking. The screw may be coated or plated with zinc, cadmium, nickel, or chromium for extra protection.

## **7. MANUFACTURING PROCESS:**

The manufacturing processes are of two different types are prevalent. In general screws are produced by machining stock material to get shank and threads. In modern technology hot or cold forming is used.

Both screws and rivet manufacturing quality largely depends on material properties. Screws for general use are machined from low carbon mild steel rods in automates that carry out several operations viz straightening, cutting, head forming, slotting of head, thread rolling, and shaving of head etc.

Rivets are made from ductile low carbon medium carbon or alloy steel materials that can achieve the plastic deformation without cracking and failure. The rivets of different lengths are produced by cold forming of head and the semi or total tubular forming is done through piercing of shank. The rivets are normally annealed to achieve the desired ductility.

The sequences of operation are:

1. Making of head on header machine.

2. Slotting of head for screw – on slotting machine.
3. Machining or rolling of thread on automatic threading machine.
4. Heat treatment, surface treatment annealing & tempering as per the need.
5. Galvanizing or Electroplating
6. Quality testing, Inspection and packing before dispatch.

The final products may undergo polishing through pickling, phosphating, and heat treatment and may be zinc or nickel plated or galvanized. These products are normally polished through tumbling.

## 8. MANPOWER REQUIREMENT:

The unit shall require highly skilled service persons. The unit can start from 16 employees initially and increase to 31 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	16000	4	6	8	8	10
2	Semi-Skilled/ Helpers	7000	6	8	10	12	12
1	Supervisor/ Manager	25000	1	1	1	1	1
2	Accounts/ Marketing	16000	1	2	2	2	2
3	Other Staff	7000	4	4	6	6	6
	TOTAL		16	21	27	29	31

## 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 (Activities run concurrently)	6

## 10. COST OF PROJECT:

The unit will require total project cost of Rs 90.04 lakhs as shown below:

Sr. No	Particulars	In Lakhs
1	Land	10.00
2	Building	20.00
3	Plant and Machinery	27.80
4	Fixtures and Electrical Installation	2.15
5	Other Assets/ Preliminary and Preoperative Expenses	2.00
6	Margin for working Capital	28.09
	TOTAL PROJECT COST	90.04

## 11. MEANS OF FINANCE:

The project will require promoter to invest about Rs 43.58 lakhs and seek bank loans of Rs 46.46 lakhs based on 70% loan on fixed assets.

Sr. No	Particulars	In Lakhs
1	Promoters Contribution	43.58
2	Loan Finance	46.46
	TOTAL:	90.04

## 12. WORKING CAPITAL REQUIREMENTS:

Working capital requirements are calculated as below:

Sr. No	Particulars	Gross Amount	Margin %	Margin Amount	Bank Finance
1	Inventories	18.02	40	7.21	10.81
2	Receivables	21.69	50	10.85	10.85
3	Overheads	2.83	100	2.83	0.00
4	Creditors	18.02	40	7.21	10.81
	TOTAL	60.56		28.09	32.47

### 13. LIST OF MACHINERY REQUIRED:

Sr. No	Particulars	UOM	Quantity	Rate	Total Value
	<b>Main Machines/ Equipment</b>				
1	Cold Head Forming Machines	Nos	2	150000	300000
2	Screw Head slot milling machine	Nos	2	100000	200000
3	Screw thread cutting/ rolling mcs	Nos	6	180000	1080000
4	Tumbling/ Polishing Barrels	Nos	2	75000	150000
5	Pickling Plant	Nos	1	150000	150000
6	Annealing Furnace	Nos	1	200000	200000
7	Plating Plant	Nos	1	200000	200000
9	Packing machines	Nos	2	80000	160000
10	Semi/ Tubular rivet making machine		1	150000	150000
	Subtotal:				2590000
	<b>Tools and Ancillaries</b>				
1	Tooling and Dies spares	LS	1	150000	150000
2	Misc. tools etc.	LS	1	40000	40000
	Subtotal:				190000
	<b>Fixtures and Elect Installation</b>				
	Storage racks and trolleys	LS	1	75000	75000
	Other Furniture	LS	1	10000	10000
	Telephones/ Computer	LS	1	30000	30000
	Electrical Installation	LS	1	100000	100000
	Subtotal:				215000
	Other Assets/ Preliminary and Preoperative Expenses	LS	1	200000	200000
	<b>TOTAL PLANT MACHINERY COST</b>				<b>3195000</b>

All the machines and equipments are available from local manufacturers. The entrepreneur

needs to ensure proper selection of product mix and proper type of dies and tooling to have modern and flexible utensil designs. It may be worthwhile to look at reconditioned imported machines, dies and toolings. Some of the machinery and dies and toolings suppliers are listed here below:

1. M/s. Perfect Machine Tools Co. Pvt. Ltd.  
Bell Building, Sir P.M. Road,  
Fort, Mumbai
2. Y. S. INTERNATIONAL INC.  
F-129, Second Floor, Rajouri Garden,  
New Delhi - 110027, India
3. J.P. Industries  
Vavdi, Survey No. 31, Plot 12, Behind Tata Perfect Show Room,  
Gondal National Highway, Rajkot-360004, Gujarat, India
4. HARDGRIP (INDIA)  
E-247, PHASE 4, FOCAL POINT,  
Ludhiana, Punjab, 143001, India
5. Metal Master Engg  
701, 702, MMRDA Lodha, Near Lodha Aqua, Opposite Thakur Mall,  
Off. Dahisar Check Naka, Mira Road (E),  
Mumbai-401107, Maharashtra, India
6. Kalsi Machine Tools  
Plot No. 59- 60, Industrial Area, Phase- 1 ,  
Chandigarh - 160002, India

Other well known machine manufacturers who can be searched from internet are Batliboi Ltd., Bharat Fritz Werner, HMT Machine Tools, Praga Tools, Toolcraft Systems.

#### 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	75	85
2	Sales	Rs Lakhs	130.14	162.68	195.22	244.02	276.56
3	Raw Materials & Other Direct Inputs	Rs Lakhs	108.13	135.16	162.20	202.75	229.78
4	Gross Margin	Rs Lakhs	22.01	27.52	33.02	41.28	46.78
5	Overheads Except Interest	Rs Lakhs	10.45	10.45	10.45	10.45	10.45
6	Interest	Rs Lakhs	6.50	6.50	6.50	6.50	6.50
7	Depreciation	Rs Lakhs	5.20	5.20	5.20	5.20	5.20
8	Net Profit Before Tax	Rs Lakhs	-0.13	5.37	10.87	19.13	24.63

The basis of profitability calculation:

The Unit will have capacity of 250 MT of Fasteners per year with product mix consisting of standard products in wood screws machine screw, nuts, rivets up to 6 mm shank diameter. The bulk /Distributor sales prices for screws, bolts and nuts range from Rs 50 to Rs 350 per Kg for standard products depending on materials, grade, and head type, length of screw etc. The raw material used are mild steel, brass, aluminum, etc wire rod. The raw material price ranges from Rs 28 to Rs 250 per Kg. The material requirements are considered with wastage/ scrap of 10 % of finished products, which can be sold at @ Rs 25 per Kg. and the income of same is added. 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 can reach break-even capacity at 42.02 % of the installed capacity as depicted here below:



Sr. No	Particulars	UOM	Value
1	Sales at Full Capacity	Rs Lakhs	325.36
2	Variable Costs	Rs Lakhs	270.33
3	Fixed Cost incl. Interest	Rs Lakhs	22.15
4	Break Even Capacity	% of Inst Capacity	40.24

## **16. STATUTORY/ GOVERNMENT APPROVALS**

The unit shall need industrial unit registration of state. The industry registration and approval for factory plan, safety for Fire requirement, registration as per Labor laws ESI, PF etc shall be required as per rules and applicability. Before starting the unit will also need GST registration for procurement of materials as also for sale of goods. There are no pollution control requirements, while unit will have to ensure solid waste/ scrap disposal in proper manner. Entrepreneur may contact State Pollution Control Board where ever it is applicable.

## **17. BACKWARD AND FORWARD INTEGRATION**

The machines and equipments offer scope for diversification in to producing tailor made products for consumer for their industrial parts/ components by using the spare capacities and machine capabilities which may be attempted. As such there is not much scope for organic backward or forward integration.

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

There are no specific training centers for this product design or production technology. However the dies and Tools development courses run by several centers of excellence viz Indo German Tool Room at Ahmedabad, Rajkot, Chennai, and CTTC Bhubaneshwar shall be helpful.

The most important scope of learning is in new product design and development by associating with institutes like NID etc. Entrepreneur may also study the new product designs, product range, features and specifications of leading Brands / competitors across the world by

scanning the Internet and downloading data. 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.