DESIGN AWARENESS PROGRAM REPORT
STEEL FURNITURE
24 PARAGANAS NORTH | WEST BENGAL

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DESIGN AWARENESS PROGRAM REPORT

MSME DESIGN CLINIC SCHEME

SUPPORTED BY GOVERNMENT OF WEST BENGAL

In association with

All Bengal Steel Furniture manufacturers Association
PREFACE

The small and medium scale industries play a very important role in the Indian economy as they provide employment to about 14 million persons and contribute to 45% of the industrial production equivalent to 7% of the gross national product. Besides, the sector generates 35% of the direct exports. One of the mechanisms to promote SME development that has become popular the world over is the idea of industrial clustering.

In India 85% of Furniture industry in unorganized and faces the challenge of modernisation, workmanship and sharp competition. So the challenge lies in upgrading and modernisation.

This report is a cluster level report of Interactive Study of 21 units of 24 Paragana(North) Dist, west Bengal, under the premise of MSME design awareness scheme.
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INTRODUCTION

Furniture industry is very large and around 85% is unorganized. This sector works in different materials and skill sets. Few clusters are purely craft based like Sunkheda furniture where as few are completely working on contemporary designs and trends. India is a cost driven market and so the industries. Under pressure of cost cutting they compromise on quality and also do not invest in design and research. Also they lacks reach to advance technologies, designs and technical skills. Our effort in this report to highlight these issues and also suggest the intervention on industry and government level.
24 PARGANAS (N) DISTRICT

North 24 Parganas district is the second most populous district of India which lies in the southern West-Bengal. It shares its west border with Bangladesh and hence 42% of the population consists of Hindu refugees.

LOCATION

It lies in the Ganges-Brahmaputra delta with Ganges flowing on the west border.

CLIMATE

It enjoys tropical climate as rest of the Gangetic West-Bengal. With maximum of 41°C and 10°C temperature, it has dry winters and humid summers. Monsoons last from early June to mid-September.

DEMOGRAPHY

With the population density of 2,463 inhabitants/sqkm, it enjoys 1st rank in West-Bengal and 2nd in India as the most populous state. It has 949 females for every 1000 male ratio and 84.95% literacy rate. 42% of the population are the Hindu refugees from Bangladesh with almost 3:1 ratio of Hindu and Muslims.

ECONOMY

It is not very developed in terms of economy where most of the Hindu population is engaged as industry work-force whereas Muslims depend on farming, fishing and other agricultural activities for their livelihood.

FLORA & FAUNA

A partial home for Sundarbans National Park and Bibhutibhusan Wildlife Sanctuary, it enjoys good share of variety of both flora and fauna.
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NEED ASSESSMENT SURVEY
CLUSTER INFORMATION AND DETAILS OF UNITS

01. DETAIL OF UNITS

02. DEMOGRAPHIC DISTRIBUTION OF UNITS

03. BUSINESS MODELS

04. FURNITURE RANGE

05. TOOLS AND MACHINERY
   (A) Hand Tools
   (B) Machinery

06. PROCESS & TECHNIQUES
## 1. DETAILS OF UNITS

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2. DEMOGRAPHIC DISTRIBUTION OF UNITS

There are around 20 units which are placed at 1-100 kms apart in the district itself. They are easily approachable from Kolkata hence most of the material is sourced from there. A common facility centre needs to be strategically placed to benefit these units.

Business opportunities

These units are able to sell their products in the local market itself as there is good demand for the same. Few of the units are supplying their products to Kolkata. Their reach can be defined in terms of primary, secondary and tertiary zones which includes the nearby districts like Bardhaman, Hoogly, Nadia, Kolkata and 24 South Pargana district.
3. BUSINESS MODELS

INDUSTRY
- MICRO SCALE
- SMALL SCALE

18%

RETAIL
- WITHIN SAME TOWN
- KOLKATA
- NEARBY DISTRICTS

61%

CONSUMER
- HOUSE HOLD
- OFFICES
- INSTITUTIONS ETC.

21%
04. FURNITURE RANGE

SHOWCASE

DRESSING TABLE

BOOK RACK

ALMIRA 3 DOOR

OPEN STORAGE

ALNA

STORAGE

ALMIRA 3 DOOR
05. TOOLS AND MACHINERY

(A) Hand Tools

The hand-tools used in these units are locally made, hence they are not uniform and are of poor-make. This results in poor quality workmanship which reflects in the final product. More number of defects in the product leads to increased work in the finishing process. Better-designed and good-quality tools will also result in less fatigue for the user.
Most of the units are equipped with a mix of manual or semi-automatic machinery. They are either manually or electrically driven machines. This increases the dependency on skilled and semi-skilled labour which also increases the time taken to finish a job. It has a deep impact on the productivity and the quality of the product too as the control on each stage has to be managed well.

These factors result into the final increased cost of the product which can be reduced by using more automatic machines.

1. Screw bending machine
2. Grinder
3. Compressor
4. Universal bending-machine
5. Hand grinder
6. Arc-welding machine
7. Ball-bending machine
8. Drill press
9. Gas-welding machine
10. Spot-welding machine
06. PROCESS & TECHNIQUES

**STORAGE**
- MS Sheets
- Box sections
- MS Flats
- L angle
- Primer paint coat

**FABRICATION**
- Sheet marking
- Sheet Cutting/ Pipe cutting
- Part fabrication
- Assembly

**PAINTING**
- Surface preparation
- Putty work
- Spray paint
- Heat chamber
- Drying

**STORAGE**
- Finished furniture storage
- Transportation
COMMON PROBLEMS AND RECOMMENDATION

01. WORKER RELATED PROBLEMS
   (A) Lack of technical skills
   (B) Labour shortage
   (C) Lack of specialization in work
   (D) Frequent job change

02. FABRICATION PROCESSES AND TECHNIQUES
   (A) Sheet marking
   (B) Cutting
   (C) Bending
   (D) Assembly
   (E) Welding
   (F) Grinding and finishing

03. FINISHING PROCESSES AND TECHNIQUES
   (A) Sheet marking
   (B) Cutting
   (C) Bending

04. STORAGE

05. TRANSPORTATION
1. WORKER RELATED PROBLEMS

The cluster units are using very basic machinery like drill machine, manual screw bending machine, gas welding and arch welding. So the furniture quality completely depends on labour skills so it was a very important part of the survey. Following are the important aspects that needs to be highlighted and addressed immediately:

(A) Lack of technical Skills
The labourer are not technically trained and lacks technical knowledge to handle different machines like bending machines, grinder, drill machines etc. Because the production highly depends on labour skills. Ultimately quality of manufacturing goes down and it reflects in the finished furniture.

Recommendation:
- Skill development program
- Technical training workshops

(B) Labour shortage
The industry highly depends on manual work and unfortunately labourer shortage is a very big problem in the area. Due to that in few industries production has gone down drastically. In one of the cases Mr. Pralay form Samrat steel furniture has explained that production of his industry has gone down by 70%. Earlier he use to produce 100 units per month that has gone down to hardly 30 units. All because of labour shortage. His industry is not the only case most of the industries are facing the same problem.
A lot of people relate the problem with “Pradan mantri Rojgar yojna” and believes explains that a big percentage of the metal labours has shifted from furniture industry to this scheme.
This problem highlights the urgent need for automation in the sector.

Recommendation:
- Automation of units
- Promote permanent labour on monthly salary basis
(C) lack of specialization in work
The very surprising and common problem in all units is lack of specialization in workers. Almost all the workers do all jobs starting from marking on sheets to cutting, bending and welding. That leads to lot of problems within the manufacturing process. Following are outcome of this practise:
. Less output per worker.
. Because every one is working on everything they lose specialization on one
. Difficult to define responsibilities.

Recommendation:
. Work on assembly line process
. Divide work based on skills and capabilities.
. Trained few workers for bending and welding jobs.

(D) Frequent Change in Jobs:
The industry hires the labour on daily contract basis, so they don't stick to one job and change it frequently. Due to different labours working on the same jobs the consistency dose not come across all range of furniture.

Recommendation:
. Promote permanent labour on monthly salary basis
. Introduce incentives etc
2. FABRICATION PROCESSES AND TECHNIQUES

(A) Sheet marking

Sheet marking is the first step of fabrication hence very important also, any mistake while marking may lead to a bigger problem while assembly and furniture shape. So its very important to do a correct marking. A good marking depends on workmanship as well as good tools.

Problems:
- Improper marking.
- Working on floor for Marking
- Lack of good measuring tools
- Different methods of marking between team like templates or steel scale etc

Ergonomic Issues:
- Working posture
- No protection for hands and other exposed body parts

Solutions:
- To have a working table for marking.
- Use of proper measuring tools.

Working on floor reduce the efficiency also odd postures leads to less productivity

Working posture of worker is very bad it may lead to joint problems

Hands and legs are directly exposed to sharp sheet and tools, and it can cause cuts and injuries

Marking with improper tools

Sitting on template white marking will not give enough flexibility to adjust template

Foot marks dilutes the markings
(B) Cutting

Manual sheet cutting requires a very skilled labour and precision. So it not only increases the chances of error in cutting also require more manpower in a time when the industry is struggling with labour shortage. Because its a time taking process so it effects the industry output as well.

Problems:
- Use of conventional manual tools takes more time consuming.
- Working on floor.
- Lack of good tools.
- Poor cutting quality/edges due to manual cutting.

Ergonomic Issues:
- Wrong working posture.
- No protection for hands and other exposed body parts.
- Mishandling of tools.

Solutions:
- Use of hand operated or electric shearing machine.
- Use of proper tools.
(C) Bending
Bending is the most time taking step in entire process. Both methods are in practice in different units as:
  . Manual bending
  . Machine bending

Manual Bending is typically done with help of hand tools like: stake, hammer and chisel. It's quite effective for small parts like shutters, panels etc.

Problems:
  . No uniformity across parts.
  . Rough corners and surface requires more finishing efforts
  . Poor bend quality
  . Requires more manpower and increase the dependency on labours

Ergonomic Issues:
  . Wrong working posture
  . No protection for hands and other exposed body parts
  . Mishandling of tools
  . Noise pollution

Solutions:
  . Shift to semi shear cutting machines
  . Use of quality hand tools
  . Working on table.

Sheet may shake while hammering so the corners and edge are not sharp and looks unfinished

Small stool is very uncomfortable to sit

Not eye protection may cause accident

Hands are not protected while fast hammering

Close body posture is not suggested for a heavy work like hammering, lifting etc.

Bare body parts are prone to get cuts and injuries


Machine Bending is a part of their bending process, ultimately the final finish was given by hand tools only hence final product still suffers the finishing issues. Two popular machines was common in use:

- Screw bending Machine
- Universal bending machine

Problems:

- No uniformity across parts.
- Rough corners and surface requires more finishing efforts
- Requires more manpower and increase the dependency on labours

Ergonomic Issues:

- Wrong working posture
- Exposed parts to machine
- Mishandling of tools
- Extra pressure on different body parts

Solutions:

- Shift to shear cutting machines
- Use of quality hand tools
- Training to use machines

Screw Bending Machine

Same tool limits bending options

Careless handling and exposed body parts are prone to accidents

Very odd postures creates extra pressure on body, also it can cause muscle problems

Universal Bending Machine

Lack of knowledge for handling machines

Welding is a precise job and requires lot of safety measures to protect worker from health and safety related issues. It was being used for joining part and assembly. The three type of welding was being used were:

- **Arc welding**
- **Gas welding**
- **Spot welding**

Problems:

- Lack of protection gears like eye wear, gloves and mast.
- Exposed body parts while welding
- Lack of skilled labour
- Different kind of pollutions

**Ergonomic Issues:**

- Wrong working posture
- Exposed parts to welding results in burns
- Improper eye protection can lead to partial blindness
- Lack of mask may result into severe lung problem

**Solutions:**

- Use of safety equipment
- Strict safety rules on unit level to avoid accidents
- Technical Training for welding
**E) Assembly**

Assembly gives the final shape to furniture and this is the most time taking process after bending. So more errors in parts increases the assembly time. The parts are typically join by rivets and welding depends on the strength and surface finish required.

**Problems:**
- No process of assembly every one has their own style, It creates confusion
- No uniformity across parts
- Rough corners and surface takes more time to assemble
- Requires more manpower and increase the dependency on labours

**Ergonomic Issues:**
- Working on ground leads to efficiency issues
- Wrong working posture
- Exposed parts to machine
- Handling sheet metal parts without gloves

**Solutions:**
- Defining process of assembly
- Working on a high platform
- Use of safety gears
(F) Grinding and finishing

Finishing and grinding of surface is very critical for final painting jobs, all bad work of previous stages increases the finishing time. As the units are highly dependent on manual work so the finishes takes more time to hide the human errors. Manual or electric grinding machines were being used to clear extra steel while welding.

Problems:
. Finishes of previous stage
. Use of more arc and gas welding
. Rough corners and surface takes more time to finishes
. Requires more manpower and increase the dependency on labours

Ergonomic Issues:
. Exposed to metal dust
. Working on ground leads to efficiency issues
. Wrong working posture
. Exposed parts to machine
. Handling sheet metal parts without gloves

Solutions:
. More use of spot welding
. Use of proper gears like gloves and mask etc

Wrong leaning posture may lead to back problem and drop in efficiency

No protection for hands in while handling electric grinder and sharp sheets

Mishandling of electric tools can lead to an accident

Buffering and finishing the surface releases lot of metal dust, labourers needs to wear mask to protect themselves from hazardous metal dust
3. FINISHING PROCESSES

(A) Painting
Base preparation takes lot of time and putty because surfaces are uneven by applying 2-3 coats of putty and then keep it to dry for 2-3 days. Then spray paint while color matching always remains as a challenge for the painters.

Problems:
- Uneven surfaces
- Use of thin gauge sheet like 26, 28 gauge.
- Rough corners and surface takes more time to finishes
- Requires more manpower
- Consistency in colors

Ergonomic Issues:
- Inhale spray paint/ thinner
- Handling sheet metal parts without gloves

Solutions:
- Right methods for color mixing
- Use of proper gears like gloves and mask etc
- Training for painting staff

Preparation of putty, mixing on average basis
Working posture is more tiring and reduce output
Use of extra putty because of uneven surface
Putty takes time to dry
Spray paint quality is good
Difficult to keep the consistency in colors
Conventional paint finishes are not good and needs to be designed again
(B) Powder coating

Powder coating is a good option for industries with advantages like uniformity and consistency in mass production. Good setup or investment is required for the powder coating plant, so only a few units have the facility. Also, powder coating goes through chemical processes and then powder spray and finally heat chamber. So, a lot of expertise is required for good results. Also, there are a lot of safety and health requirements for the plants to follow.

Problems:
- Exposed body parts to dangerous chemicals.
- No proper method to dispose industry waste.
- Unskilled labour

Ergonomic Issues:
- Labourers inhale spray powder in absence of mask.
- Exposed body parts to chemicals.
- Wrong posture while lifting.

Solutions:
- Proper disposal of waste.
- Use of proper gears like gloves and mask etc.
- Training for staff.
4. STORAGE

The products of the unit are stored at the same place where they are displayed. They are kept unpacked. Lying next to each other, there are more chances of damages. For displaying any other product, they need to shift the product kept in front of it. This often shifting of products may lead to damaging the product itself.

Since all the products are stored on the floor, hence there is scope of stacking the product on lofts. This will result in better storage and display solution.

Recommendation:
- Segregation of the products for storage and display.
- Vertical storage for smaller products for better space utilisation.
- Proper packaging for lesser damages in storage.
5. TRANSPORTATION

The finished products are transported without any packaging. They are pulled and carried to the vehicle with the help of 3-4 men. There is a lot of mishandling involved while carrying the product to the vehicle and thereafter. This leads to small/severe damages in the product till it reaches the buyer.

Problems:
. No packaging for the product.
. Mishandling while carrying it to the vehicle.
. Prone to damages while carried in the vehicle as there is hardly any protection.
. Prone to scratches and dents because of the ropes/vehicle body.

Solutions:
. Need proper packaging solution to minimise damages till the product reaches the customer.
. Proper mechanical assistance for the labours while pulling and carrying the product.
01. DESIGN AND AESTHETICS
   (A) Conventional designs
   (B) Conventional design with contemporary finishes
   (C) contemporary Designs

02. BRANDING
1. DESIGN AND AESTHETICS

(A) Conventional designs

They consist of the conventional usage items as almirahs, show-cases, racks, alnas and storage units. With conventional finishes, textures and functional value, these items make up to the core of the product-offering of the company. The designs are mostly inspired from the product line-up of the giants in the same industry. Such industries are more focused towards the residential segment.

ALMIRAHS/WARD-ROBES:
- Imitated patterns
- Utilitarian additions
- Louder local elements
- Universal colours
ALNAS:

Conventional designs with mix and match of bright colours, patterns and features.

- Bright colours
- Pattern on glass
- Low-quality hardware
- High-quality finishes
- Imitated patterns
SHOW-CASES + ALNAS:
A region-specific furniture for house-hold usage. Bright colours, highlighted beading, glass-panels etc. are the elements which cater to the regional taste.

STORAGE UNITS:
Mostly for office purpose, made from thin sheet-metal, local hardware but good-quality locks. They are painted with colours of universal acceptance of the region. Innovation is mostly restricted to shutter leafs, edge-forms and handles.

DRESSING TABLE:
It forms an integral part of the furniture of a bedroom. As wooden furniture is getting costly, these kind of products often appear as a substitute of the same with similar imitated wooden patterns on them.

RACKS:
Used in offices and residences, these products are manufactured with simple forms and functional value. The colours are also universally accepted in the region.
(B) Conventional design with contemporary finishes:

With the increasing reach of the industry giants in the local areas, these units try to match the aesthetic offering of such products. The conventional products with finishes and colours following the latest trends make the products look more up-market. These changes are brought in elements like door/shutter handles, locks, colours and shutter-design.

- High-gloss finish
- Simple forms
- Chrome-plated elements
- Bright pastel colours
(C) Contemporary Designs:

As an attempt to compete with the products of the industry giants who are trying to penetrate through the market of the unorganized sector, these units are manufacturing products which are inspired from the products of these industry giants. They are simple in forms and function. With high-quality finish, neat looks and competitive prices, they cater well to the upper segment of the market.

ALMIRAH/WARD-ROBES:

- High-quality finish
- Neatly bent sheet
- Simple lock design
- Latest colour trend
STORAGE UNITS:

- Chrome-plated brand logo
- Neatly bent sheet
- High-end finishes
- Metal-glass combination
2. BRANDING

Being not the major brands of the market, these units have not taken their branding seriously. The motifs, logos, fonts and finishes used in the badges of the product are not very distinctive enough to create effective brand-recall. The branding of the unit is represented in the form of a badge near the lock, handle or top side of the shutter.
- Regular legible fonts
- Integrated with lock
- Same artwork used
UNIT SPECIFIC PROBLEMS, REMEDIES AND OPPORTUNITY

01. UNIT 1 TO 21
   (A) Introduction
   (B) On spot suggestion given during NAS
   (C) Issues
   (D) Opportunity areas for design intervention
UNIT 01
Paul engineering works

Paul engineering works mainly manufactures house hold furniture and some time for offices depends on orders. Furniture range is as follows:
1. Almira
2. Alna
3. Showcase
4. Table etc

Suggestion given during NAS
Though the unit has most of the facilities but workstation and storage areas were in mess.
- Organized work stations
- Worker specialization in particular jobs
- Working on platforms

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UNIT 02
Renu Durga Furniture

Renu Durga Furniture is a very small unit (Aprox 300 sqft) and mainly manufactures sheet metal furnitures like:
1. Almira
2. Alna
3. Showcase
4. Dressing Table etc

Suggestion given during NAS

• To improve product quality.
• Suggested colors for furniture
• Organized workshop
• Worker specialization in particular jobs
• Working on platforms
• Utilisation of space

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UNIT 03
Ashoke Steel Furniture

Ashoke Furniture industries works in different materials and has a comparatively big setup. Furniture range are as follows:
1. Almira
2. Alna
3. Showcase
4. Table etc

Suggestion given during NAS
- To develop new designs while collaborating with MSME
- To arrange the workshop area
- New metal to metal joinery
- Welding techniques

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**Special opportunity:**

Ashoke furniture industries works in different materials such as Stainless steel, Mild steel, Rot iron and wood. Also they have relevant tools and machines.  
**Finishes:** Unit has its inhouse facilities like powder coating, paint both and wooden polishing. They can produce furniture with combination of materials like steel and wood etc.

**Scope of new Furniture development:**

Ashoke Furniture industries have opportunity to develop the whole new range of furniture in-house using Steel, wood and glass. Few possibilities are as follows:

1. Dining area furniture
2. Living room furniture
   - Tv cabinet
   - Coffee table
   - Side tables
   - Chairs
3. Public space furniture
   - Benches
   - Planters etc
UNIT 04
Haldar Steel Furniture

Haldar Steel furniture is a part of their wood business. Its located in a far off place Hingalganj. Unit’s furniture ranges from:
1. Almira
2. Alna
3. Showcase
4. Dressing Table etc

Suggestion given during NAS
- To improve product quality.
- Suggested colors for furniture
- Organized workshop
- Worker specialization in particular jobs
- Working on platforms

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Special opportunity: Wood+Steel furniture

Since Halder steel furniture also has a wood saw mill so they have reach to good quality and cheaper wood. There is a opportunity to develop solid wood and Steel furniture. If done well can be supplied to Kolkata market.

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UNIT 05
lokenath industries

Lokhnath industries’s furniture has a decent size industrial building, there is a good scope to further expand the operations. Their furniture ranges from:
1. Almira
2. Alna
3. Showcase
4. Dressing Table etc

Suggestion given during NAS
. To improve product quality.
. Suggested colors for furniture
. Organized workshop
. Welding techniques
. Working on platforms

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UNIT 06
Steel In

Steel In furniture has a big setup for metal and concrete works. Unit’s furniture range includes:
1. Almira
2. Alna
3. Showcase
4. Dressing Table etc

Suggestion given during NAS
- Tool management
- Combine materials like concrete and steel
- Worker specialization in particular jobs

Special opportunity: Steel + concrete furniture

Since Steel In furniture is part of Mr. Asit Paul’s main business of Concrete electric poles. He supplies it to state govt electricity boards. There is a growing demand for street furniture in public and private sector. Since Mr. Asit is already has both setup in the same campus there is a very good opportunity for him to develop street furniture in steel and concrete with existing setup. As he is already supplying to govt bodies, he could be easily for him to pitch public furniture too.

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UNIT 07
Lion Steel Furniture

Lion steel furniture has 4 small units in a very close proximity. They have good setup of machines and more organized workshops. Unit’s furniture ranges from:
1. Almira
2. Alna
3. Showcase
4. Dressing Table

Suggestion given during NAS
- To invest in new design development
- Tryout new color palette
- Develop new range
- Worker specialization in particular jobs

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Special opportunity:

Lion steel furniture industries is a fast growing industry. Their large production goes directly to retail showrooms. They have a variety of machinery like spot welding, arc welding, screw bending, ball bending and good paint facilities. The unit hardly faces labour problem. That makes them well capable in handling bulk orders like school furniture etc.

To find more opportunities unit must realize their strength of handling large orders and should work towards it in terms of design development, marketing etc.

Scope of new Furniture development:

Lion steel Furniture have opportunity to develop the whole new range of furniture in-house using Steel, wood and glass. Few possibilities are as follows:

1. Dining area furniture
2. Living room furniture
   - Tv cabinet
   - Coffee table
   - Side tables
   - Chairs
3. Public space furniture
   - Benches
   - Planters etc
4. Schools etc
UNIT 08
Maa Kamaksha Steel Furniture

Maa Kamaksha steel furniture has a medium size workshop and retail outlet on same location. Their furniture range includes:
1. Almira
2. Alna
3. Showcase
4. Office furniture

Suggestion given during NAS
- To introduce new furniture
- Organized workshop
- Worker specialization in particular jobs
- Working on platforms
- Waste management

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UNIT 09
New Diana Steel furniture

New Diana steel furniture is run by Mr. Nirmal Chandra Roy who has a very good industry experience in India and abroad. Units furniture range includes:
1. Almira
2. Alna
3. Showcase
4. Dressing Table

Suggestion given during NAS
- To improve product quality.
- Suggested colors for furniture
- Organized workshop
- Worker specialization in particular jobs
- Working on platforms

Special opportunity:
Mr. Nirmal Roy’s understanding of details and finishes is very good. Even his existing furniture range is also good quality.

There is a good opportunity for him to customize furniture and experiment in different finishes.

Unit can also tie-up with design houses in Kolkata for their concept prototyping.

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UNIT 10
Usha Steel furniture

Usha steel Unit’s furniture has a manufacturing setup and retails on same place. Other than metal furniture he also sells plastic toys and furniture. He has also manufactured some folding furniture. He mainly manufactures:
1. Almira
2. Alna
3. Showcase
4. Dressing Table
5. Folding furniture

Suggestion given during NAS
1. Develop new range of folding furniture
2. More organized workshop
3. Worker specialization in particular jobs
4. Combination of different furniture

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**UNIT 11**  
**TBS Gharana**

TBS Gharana has a medium size setup with basic machinery like bending and welding machines. List of the furniture unit manufactures:
1. Almira
2. Alna
3. Showcase
4. Dressing Table

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**Suggestion given during NAS**
- Avoid child labour
- Introduce more furniture
- Organized workshop
- Worker specialization in particular jobs
- Working on platforms

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UNIT 12
Das Furniture Works

Das Furniture Works has a small setup yet they have a very efficient team. Their production is decent quality. They mainly manufacture:
1. Almira
2. Alna
3. Showcase
4. Dressing Table
5. TV cabinet

Suggestion given during NAS
- To improve manufacturing quality
- Suggested metal joinery
- Worker specialization in particular jobs
- Color options

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<td>• Training and skill up-gradation</td>
<td>Yes</td>
</tr>
<tr>
<td>• Branding and Visual communication</td>
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</table>
UNIT 13
Ashirwad Steel Furniture

Ashirwad Steel Furniture setup is spread in a big area in small small shelters. The machinery and facilities are very basic. Their furniture range:
1. Almira
2. Alna
3. Showcase
4. Dressing Table

Suggestion given during NAS
- To improve complete factory setup
- To improve paint facilities
- Worker specialization in particular jobs
- Working on platforms

<table>
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<tr>
<th>Issues</th>
<th>Remarks</th>
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<tr>
<td>Labour problem</td>
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<td>Branding and Visual communication</td>
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</table>
UNIT 14
Lokhnath Engineering

Lokhnath Engineering’s setup is comparatively new and has lot of scope to grow. The mainly works in:
1. Almira
2. Alna
3. Showcase
4. Dressing Table
5. Office table

Suggestion given during NAS

- To introduce new range of furniture
- Metal welding methods
- Organized workshop
- Working on platforms

<table>
<thead>
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<th>Issues</th>
<th>Remarks</th>
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<td>Yes</td>
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<tr>
<td>• Branding and Visual communication</td>
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</table>
UNIT 15
Sri Krissna steel furniture

Sri Krissna Steel Furniture factory is in bad condition. Their setup is very basic and old with problems like natural light and ventilation. Their furniture range starts with:

1. Almira
2. Alna
3. Showcase
4. Dressing Table etc

Suggestion given during NAS
- To improve working conditions in factory shed
- Worker specialization in particular jobs
- Working on platforms

<table>
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<tr>
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<th>Remarks</th>
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<td>• Technology, modernization and automation</td>
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<tr>
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<td>Yes</td>
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<tr>
<td>• Packaging, storage and transportation</td>
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<td>• Training and skill up-gradation</td>
<td>Yes</td>
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<tr>
<td>• Branding and Visual communication</td>
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</table>
The Elite Furniture is a medium-size industry with below-average infrastructure. Lacks natural light and good ventilation. Their core furniture range is:

1. Almira
2. Alna
3. Showcase
4. Dressing Table
5. Office furniture

**Issues**

<table>
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<tr>
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**Opportunity areas for design intervention**

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</table>

**Suggestion given during NAS**

- Avoid child labour
- Suggested colors for furniture
- Organized workshop
- Worker specialization in particular jobs
- Working on platforms
- Provision for natural light and ventilation
UNIT 17
Lion steel furniture

Lion steel furniture is the biggest unit in the cluster. They have all facilities in house like powder coating plant, sheet cutting, bending etc. They also do job work for powder coating other than their own production. Their furniture ranges from:
1. Almira
2. Alna
3. Showcase
4. Dressing Table
5. Office furniture

Suggestion given during NAS
- To improve product quality.
- Suggested colors for furniture
- Organized workshop
- Worker specialization in particular jobs

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<td>Yes</td>
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</table>

Special opportunity: Mass production of steel furniture

Lion steel furniture has a big setup and all facilities in house with good labour strength, it makes them well capable of handling big orders like school furniture, public area furniture, office furniture etc. Also they can get new range designed for respective markets and can start their own range since they are well aware with local market.
UNIT 18
Samrat steel furniture

Samrat Steel furniture is situated near to Barasat town. They mainly deals in house hold furnitures like:
1. Almira
2. Alna
3. Showcase
4. Dressing Table

Suggestion given during NAS
1. Introduce new range of furniture
2. To improve product quality.
3. Suggested colors for furniture
4. Organized workshop
5. Improve paint quality

<table>
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<td>Branding and Visual communication</td>
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</table>
UNIT 19
Ghosh steel furniture

Ghosh steel furniture is a medium size unit with basic tools and machinery. They largely produce:
1. Almira
2. Alna
3. Showcase
4. Dressing Table
5. Table

Suggestion given during NAS
. To increase sheet thickness of furniture for better quality
. Suggested colors for furniture
. Organized workshop
. Worker specialization in particular jobs

<table>
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<td>Ergonomic issues</td>
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<td>Environmental issues</td>
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<td>Branding and Visual communication</td>
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UNIT 20
Riya steel furniture

Riya steel furniture has a small setup and works with very basic hand tools and bending machine. Their furniture range is mainly:
1. Almira
2. Alna
3. Showcase
4. Dressing Table
5. Book rack
6. Office almira

Suggestion given during NAS
- To improve product quality.
- Suggested colors for furniture
- Organized workshop
- Worker specialization in particular jobs
- Working on platforms

<table>
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<tr>
<td>Labour problem</td>
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<td>Branding and Visual communication</td>
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UNIT 21
Sunanda steel furniture

Sunanda steel furniture manufactures both modern and old designs in house hold furniture range. Following are the furniture they largely manufactures:
1. Almira
2. Alna
3. Showcase
4. Dressing Table
5. Boos racks

<table>
<thead>
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**Opportunity areas for design intervention**

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</table>
Since these kind of units form core part of the unorganized sector, hence there is a huge scope of improvisation at each stage. These units have similar small or large set-ups and hence have similar problems. They can be addressed as part of:

1. Short-term interventions
2. Long-term interventions

These improvisations could happen at individual as well as group level. These interventions can come in various ways as schemes, awareness programs and upgradation of the set-ups itself. A phase-wise improvisation of the units will lead to better productivity and hence better returns. The design clinic has a huge role to play for making these units understand the purpose and importance of such interventions.
SHORT-TERM INTERVENTIONS

TRAINING PROGRAM: Specific skill development workshops, training camps and courses can enhance the level of workmanship of the labourers.

TOOL & EQUIPMENT: Improvement in existing tools and equipments will lead to less fatigue and better product.

CROSS-INDUSTRY JOB: Since different units are specialised in different materials and processes, hence there strengths can be combined to bring up products with varied materials.

AWARENESS OF SCHEMES: There are lot of financial schemes floated by the government which can be used by these units with proper knowledge of the same.

INFRASTRUCTURE IMPROVEMENT: There could be small improvements in the infrastructure of the unit as improving the height of workstation, proper lighting, storage solutions etc. which can result in improved productivity of the unit with lesser fatigue for the workers.

MARKETING: Proper approach to the market will lead them to improve their product offering. It will also help them know the DNA that their product should have to compete with other products in same category.

PRODUCT DESIGN: There could be designing of new products to broaden their product line-up. It could also happen as a partial addition or improvement of an existing product.
LONG-TERM INTERVENTIONS

COMMON FACILITY CENTRE: Since many of the problems/requirements of these units are common, hence there could be a common facility centre to cater such needs. These centres can be well-sustained by mutual efforts from the government and the cluster itself. Such common resource centre can be developed after considering the common needs of the units.

TECHNOLOGY UP-GRADATION: Phase-wise up-gradation of the technology will improve the productivity of the unit. They will also be able to reduce their dependency on less-skilled labour.

RESEARCH & DEVELOPMENT: Efforts to develop new processes, materials, joinery, tools and strategies could result in better returns. This could happen at micro and macro level which could be supported by the units themselves.

PROCESS-AUTOMATION: Such advancements will lessen the mishandling of the parts while manufacturing. The quality control will be better which will result in less efforts while finishing.
SUGGESTIONS
FURNITURE CATEGORY

OFFICE
- CABINS
- OFFICE TABLE
- CHAIR
- SIDE TABLE
- SOFA
- CENTRE TABLE
- CONFERENCE
- CONFERENCE TABLE
- CHAIR
- CAFE/ PANTRY
- DINING TABLE
- CHAIR

INSTITUTIONAL
- CLASS ROOMS
- BENCHES
- TABLE
- CHAIR
- CONFERENCE
- CONFERENCE TABLE
- CHAIR
- OFFICE
- TABLE
- CHAIR
- SOFA

RESIDENTIAL
- DRAWING ROOM
- SOFA
- TABLE
- SIDE TABLE
- COFFEE TABLE
- TV CABINET
- STOOL
- BOOK SHELVES
- SHOWCASE
- DISPLAY RACKS
- BED ROOM
- BED
- SIDE TABLES
- ALMIRA
- ALNA
- TEAPOY
- CHAIR
- STUDY TABLE
- DINING SPACE
- KITCHEN ALMIRA
- DINING TABLE
- CHAIR

OUTDOOR
- STREET FURNITURE
- BENCHES
- PLANTERS
- BOLVLARDS
- SEATINGS
- RAILINGS

ONLY CATEGORIES UNITS ARE MANUFACTURING CURRENTLY
Industry: Micro Scale, Small Scale
Retailer
Local Consumer
Home Furniture

Architects
Various

Builders
Various

Govt Body
Office, Public

Schools and Institutions
Office Class Room
DESIGN CLINIC WORKSHOP
<table>
<thead>
<tr>
<th>SCHEDULE OF WORKSHOP</th>
<th>11 JULY TO 15 JULY</th>
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<tr>
<td><strong>DAY 1</strong></td>
<td><strong>DAY 2</strong></td>
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<tr>
<td>WEDNESDAY</td>
<td>THURSDAY</td>
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<td>UNIT DISCUSSION</td>
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<td>Prototype discussion</td>
<td>01. Paul engineering works</td>
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<td>Guest lecture By Suman Biswas on Design development and detailing.</td>
<td>02. Renu Durga Furniture</td>
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<td>03. Ashoke Steel Furniture</td>
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<td>04. Haldar Steel Furniture</td>
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<td>05. Lokenath Industries</td>
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<td>07. Lion Steel Furniture</td>
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<td><strong>DAY 3</strong></td>
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<td>16. The Elite steel Furniture</td>
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<td>10. Usha Steel Furniture</td>
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<td>11. TBS Gharana</td>
<td>18. Samrat Steel Furniture</td>
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<td>13. Ashirwad Steel Furniture</td>
<td>20. Riya Steel Furniture</td>
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<tr>
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<td>Guest lecture by Ajay Boga on Color trends</td>
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DAY 1
WEDNESDAY
POWDER COATING

Problems:
- Exposed body parts to dangerous chemicals.
- Exposed body parts to diseases.
- Underfed labour.
- Ergonomic issues:
  - Exposing bare skin to powder in absence of mask.
  - Exposed body parts to chemicals.
  - Fibrous position while lifting.

NAS REPORT

OBJECTIVE: The objective to share the NAS report with units was to make them understand the problems on a cluster level and to think about the ways to address them collectively.

MODE OF PRESENTATION: Presentation was done by projecting slide covering NAS report. The presentation includes more visuals and text as bullet points. The slides were explained in brief.

FEEDBACKS: The first day presentation was an eye opener for unit members. But since it highlights problems it got mix opinions.

WORKER RELATED PROBLEMS

(a) LACK OF TECHNICAL SKILLS

Recommendation:
Technical training workshops, cluster level
UNIT DISCUSSION

OBJECTIVE: Unit discussion focuses more on unit level problems and opportunities. Also suggests unit level solutions and design interventions to improve product quality and production.

MODE OF PRESENTATION: It was discussed through slide presentations and personal discussions.

FEEDBACKS: Unit members were very interested to know about their units problems and ways to improve it.
DAY 3
FRIDAY

WORKSHOP
- WELL ARRANGED
- SMART IDEAS OF STORAGE
- SAFETY EQUIPMENT

NEW RANGE IN METAL FURNITURE
1. DINING AREA FURNITURE
2. LIVING ROOM FURNITURE
   - TV CABINET
   - COFFEE TABLE
   - SIDE TABLES
   - CHAIRS
3. PUBLIC SPACE FURNITURE
   - BENCHES
   - PLAYSTATIONS ETC.
4. SCH-OOLS ETC.

UNIT DISCUSSION

IMPROVEMENTS
- ORGANIZED
- CLEANING AFTER WORK
- UTILIZING THE CURRENT INFRASTRUCTURE

FURNITURE DESIGNS
- ELEMENTS
- HANDLES
- MINORS
- FINISHES
SHORT FILMS

MOVIE NAME: MANUFACTURED LANDSCAPE

DETAILS: Directed by: Jennifer Baichwal, Duration: 1:26 Hrs

SUBJECT: The film is based on industrial mass production and its impact on environment. It shows the assembly line production in and the way factories works in China.

MOVIE NAME: OBJECTIFIED

DETAILS: Directed by: Gary Hustwit, Duration: 1:15 Hrs

SUBJECT: The film talks about the relation between design process and manufacturing techniques. It covers the manufacturing of Karim Rashid’s latest furniture to Apple I Mac and shows the latest technologies used.
UNIT 13
ASHIRWAAD STEEL FURNITURE

FURNITURE RANGE
1. ALMIRHA
2. ALMA
3. SHOWCASE
4. TABLE

<table>
<thead>
<tr>
<th>Issues</th>
<th>Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Social problems</td>
<td>Yes</td>
</tr>
<tr>
<td>2. Ergonomics issues</td>
<td>Yes</td>
</tr>
<tr>
<td>3. Environmental issues</td>
<td>No</td>
</tr>
<tr>
<td>4. Unit infrastructure and tests</td>
<td>Average</td>
</tr>
<tr>
<td>5. Product quality and finishes</td>
<td>Average</td>
</tr>
</tbody>
</table>

Opportunity areas for design intervention
- Product design and development
- Technologies, modernisation and automation
- Sustainability and recycling
- Packaging, storage and transportation
- Training and skill up-gradation
- Branding and visual communication

UNIT DISCUSSION

FURNITURE DESIGNS

1. DINING AREA FURNITURE
2. LIVING ROOM FURNITURE
3. TV CABINET
4. SIDE TABLE
5. SHOE RACK
6. PUBLIC SPACE FURNITURE
7. BENCHES
8. PLANTERS ETC
9. SCHOOL ETC

Steel Furniture | 24 Paraganas North | West Bengal
Kulveer Singh Bhatti | Industrial Designer | 2012
SHORT FILMS ON WELDING TECHNIQUES

MOVIE NAME: ARC WELDING TECHNIQUES

DETAILS: Source: www.weldingtipsandtricks.com,
Duration: 10 Mins

SUBJECT: The film shows efficient tricks of arch welding.

MOVIE NAME: TIG WELDING TECHNIQUES

DETAILS: Source: www.weldingtipsandtricks.com,
Duration: 12 Mins

SUBJECT: The film shows right techniques of TIG welding.
SHORT FILMS ON SHEET CUTTING TECHNIQUES

SUBJECT: PLASMA CUTTING

SUBJECT: HAND TOOL PIPE CUTTING

SUBJECT: LASER CUTTING

SUBJECT: HAND TOOL SHEET CUTTING
SHORT FILMS ON SHEET BENDING TECHNIQUES

SUBJECT: ROBOTIC SHEET BENDING

SUBJECT: PRESS BENDING TECHNIQUES

SUBJECT: CNC BENDING TECHNIQUES

SUBJECT: CNC BENDING TECHNIQUES
DAY 5
SUNDAY

NAS REPORT CLOSURE

OBJECTIVE: NAS report closure was focused to suggest unit members way forward in terms of new designs, business models and new category as well as ways to improve production.

MODE OF PRESENTATION: It was discussed with slide presentations and prototype discussions.

FEEDBACKS: Unit members were very curious to know new business models and possibilities to grow their business. They participated very actively and every asked for unit specific opportunities.
OBJECTIVE
The idea behind Prototyping with different units was to give them a better understanding of new techniques and details as well as show them the possibility in design by using the same available infrastructure and machinery.

DESIGN
The designs for prototyping were simple and doable in 4 days time also the designs can be taken further by units to develop new range. The designs were proposed considering their market (mostly home furniture).

MATERIALS
The basic material is Mild steel for each design with a combination of different materials and color compositions to make the furniture widely accepted and reach out to a broad range of customers.
TV CABINET

DESIGN
Contemporary design for house hole TV cabinet, easy to manufacture with existing infrastructure.

SPECIFICATIONS
Material: MS sheet, SS legs and Automotive paint finish
Size: 1500mm x 450 mm x 450 mm

COSTING
Landing cost Rs. 2500/-
Market price (MRP) Rs. 5000/- to 7000/- with a profit of 100% to 180%.

Prototyping by: Das Steel Furnitures
STOOL

DESIGN
Sleek design for a daily use stool, easy to manufacture with existing infrastructure.

SPECIFICATIONS
Material: MS sheet, Teak wood top and enamel paint finish
Size: 450mm HT and 350 MM Dia seating

COSTING
Landing cost Rs. 900/-
Market price (MRP) Rs. 2000/- to 2500/- with a profit of 120% to 270%.

Prototyping by:
Lokenath Industries
COFFEE TABLE

DESIGN
Range in folded sheet design for a house hold coffee table, can be easily made with ordinary sheet bending and glass top.

SPECIFICATIONS
Material: MS sheet, 8 mm clear glass and enamel paint finish
Size: 450mm HT and 600 MM Dia seating

COSTING
Landing cost Rs. 1500/-
Market price (MRP) Rs. 2500/- to 3000/- with a profit of 160% to 200%.
Prototyping by: Lokenath Industries
STOOLS

DESIGN
Range of colorful stools for low height seating areas. It gives possibilities for different variations in heights.

SPECIFICATIONS
Material: MS sheet, 8 mm clear glass and enamel paint finish
Size: 450mm x 400 mm x 350 mm

COSTING
Landing cost Rs. 600/-
Market price (MRP) Rs. 1200/- to 1500/- with a profit of 200% to 250%.
Prototyping by:
The Elite Furniture
COFFEE TABLE

DESIGN
Low height coffee table with contemporary look can be used for living rooms or for low height dining areas.

SPECIFICATIONS
Material: MS sheet, enamel paint finish
10 mm clear glass
Size: 1200mm x 1200mm x 300mm

COSTING
Landing cost Rs. 3200/-
Market price (MRP) Rs. 6000/- to 7500/- with a profit of 90% to 230%.

Prototyping by:
Paul Engineering works
CHAIR

DESIGN
Simple form with bright colors gives it a unique identity. The chair can blend into any interior environment.

SPECIFICATIONS
Material: MS sheet, 20x40mm MS box section with automotive paint finish
Size: 500mm x 500 mm x 450 mm

COSTING
Landing cost Rs. 1100/-
Market price (MRP) Rs. 1800/- to 2500/- with a profit of 160% to 230%.
Prototyping by: New Diana Steel Furniture
TABLE

DESIGN
Simple form and optimum size of table makes it widely accepted to various uses like dinning table, office table etc.

SPECIFICATIONS
Material: MS sheet, 25x74mm MS box section with automotive paint finish
12mm clear glass
Size: 1850mm x 1075mm x 780mm

COSTING
Landing cost Rs. 3500/-
Market price (MRP) Rs. 6000/- to 8000/- with a profit of 170% to 230%.
Prototyping by:
New Diana Steel Furniture
FEEDBACKS
Prototyping helped them all to understand the importance of new designs. It not only gave them an idea about what all is possible in their workshops but also gave them confidence to manufacture such designs with same machinery and workers. In fact New Diana Furniture got an order from one of the reporters on final day so it also worked as a proof of acceptabilities for contemporary designs in local market.
### Checklist for Design Expert/s to conduct Need Assessment Survey

**Name and Address of the MSME Unit:**

_____________________________________________________________________________________

_____________________________________________________________________________________

**Contact Person with designation and contact details:**

____________________________

_____________________________________________________________________________________

**Product Range:**

_____________________________________________________________________________________

**Nature of Work:**

_____________________________________________________________________________________

**Turn Over:**


**Infrastructure set up:**

_____________________________________________________________________________________

**Employee Strength:**

_____________________________________________________________________________________

**Note:** Please elaborate below mentioned opportunity area/findings/ Suggested remedial design solution for design intervention with the help of photographs, video, graphic charts, diagrams and flow chart, while developing the report.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Opportunity areas for Design Intervention</th>
<th>Has it been covered?</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Product Design, redesign, Product Development</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Technology, modernization and collaboration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Research and development directions for future initiatives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Intermediary in process and related areas for design intervention</td>
<td></td>
<td></td>
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<tr>
<td>5</td>
<td>Workstation and Tooling design</td>
<td></td>
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<tr>
<td>6</td>
<td>Market and competition study for design advantage and distinction</td>
<td></td>
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<tr>
<td>7</td>
<td>Training and skill up-gradation, if any</td>
<td></td>
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<tr>
<td>8</td>
<td>Environmental and Environment factors</td>
<td></td>
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<tr>
<td>9</td>
<td>Packaging, logistics and storage-related design opportunities</td>
<td></td>
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<tr>
<td>10</td>
<td>Infrastructure and capability enhancement from design perspective</td>
<td></td>
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<tr>
<td>11</td>
<td>Exhibition/Display design opportunities</td>
<td></td>
<td></td>
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<tr>
<td>12</td>
<td>Visual identity and branding from communication design point of view</td>
<td></td>
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<tr>
<td>13</td>
<td>Internal communication</td>
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<tr>
<td>14</td>
<td>To create a visible impact and effectively promote the capabilities of the MSME</td>
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<tr>
<td>15</td>
<td>To improve the process of manufacturing and productivity</td>
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<tr>
<td>16</td>
<td>To service, market share and profitability</td>
<td></td>
<td></td>
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<tr>
<td>17</td>
<td>To reduce rejection, wastage in material process, resources and the duration in time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>To improve product manufacturability, workability, manufacturing process, packaging, right time operations, etc.</td>
<td></td>
<td></td>
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<tr>
<td>19</td>
<td>To add value to the products or services concerned and increase their competitiveness</td>
<td></td>
<td></td>
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<tr>
<td>20</td>
<td>To create positive difference to the MSME, either in absolute numbers (increasing higher profit or in percentage terms)</td>
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<td></td>
</tr>
</tbody>
</table>

**Remedial Design Solution suggested, if any:**

1. 
2. 
3. 
4. 
5. 

**Note:** Please elaborate above mentioned opportunity area/findings/ Suggested remedial design solution for design intervention with the help of photographs, video, graphic charts, diagrams and flow chart, while developing the report.

**Name and Contact details of Design Expert:/**

_____________________________________________________________________________________

**Design Clinic Scheme for MSMEs**

<table>
<thead>
<tr>
<th>Mail: <a href="mailto:msmeprogrammes@nids.edu">msmeprogrammes@nids.edu</a></th>
</tr>
</thead>
</table>

Design Clinic Scheme for MSMEs

Mail: msmeprogrammes@nids.edu
PROTOTYPING DRAWINGS

Chair - 01

- Side Elevation
- Front Elevation

Chair - 02

- Side Elevation
- Front Elevation

Table - 01

- Top View
- Front Elevation
- Side Elevation
### PHOTO CREDITS

<table>
<thead>
<tr>
<th>P.No.</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>01.</td>
<td>Self</td>
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</tbody>
</table>
CONCLUSION

Design awareness program started as an effort for me to make people understand the logic and benefit behind the scheme during my initial survey and to convince them to participate actively. It was not easy to introduce the word “Design” but it was interesting to interact with unit owners and workers and to understand the grass root level problems. It was interesting to work with workers and share ideas to improve details and efficiency by just changing working postures. The NAS survey also helped me to understand them and to come up with the ideas for workshop methods.

It took lot of effort to convince every one about NAS report and about improvements on unit level, but eventually they all realized the need for it. prototyping helped a lot as it a better way to experience the new designs and to get the confidence to manufacture it also.

As an individual it was a great learning and a very interesting project for me. I would like to conclude by saying that all units are facing lot of challenges and lot of competition in coming future as they have to compete not only with local players but also with international players like Ikea. It is high time that they must improve their product and processes and the solution lies in a collective effort with government.