

Technological improvement
of the tools and process used
by craftsmen in carpet
industries of India

In Technical collaboration with
Indian Institute of Technology, Delhi



CARPET EXPORT PROMOTION COUNCIL

SELECTED TOOLS AND PROCESSES FOR DEVELOPMENT

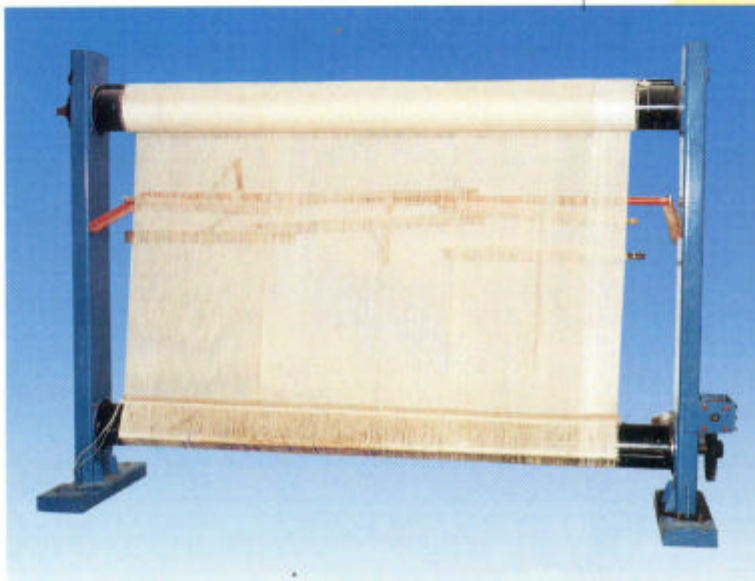
- Development of new carpet loom
- Development of new washing machine
- Development of new carpet drying process
- Development of new moisture measuring device
- Development of new trimming device
- Optimization of design of hand tools
 1. Beater (Panja)
 2. Knife (Chhura)
 3. Scraper (Phawra)
 4. Metal comb

LOOM

Salient features:

1. Beams made with the seamless (extruded) hollow pipes instead of rolled pipes, which are stronger than the former one to avoid any bending.
2. Capacity of tensioning device was increased, according to the strongest threads available.
3. Stronger locking devices provided on both sides of the upper beam.
4. Profile of hooks changed and covered by curved strip to avoid any possibility of damaging the carpet.

COMPARATIVE STUDY		
	Traditional	Improved
Quality	Bending Non uniform tension	No bending Uniform tension
Productivity	Tensioning time is more & difficult	Tensioning time is less & easy
Human effort	Cumbersome shading	Easy shading



Basic Components:

Upper Beam, Support Channel, Shedding Pipe, Polypropylene Roller, Hook Cover, Handle, Base Channel Pawl, Ratchet, Lower Beam and Tensioning Device

Carpet Loom Big 12'x10'x3' Rs. 16000/-

Medium 9'x9'x3' Rs. 14500/-

Small 6'x5'x3' Rs. 13000/-

Subsidy of 50% till March 2009

BEATER



Beater *Rs. 150/-

Advantages:

1. Positive gripping with cushioning as comfortable operation.
2. Ergonomically & aesthetically designed handle.
3. The gap between the blades optimized.
4. Shape of the blades improved.

SCRAPPER



Scrapper *Rs. 250/-

Advantages:

1. Length of handle can be adjusted according to the requirements.
2. Coating is provided on the handle for longer life.
3. Bent is provided to avoid shock.
4. Over-all weight and length adjusted to maximize the effect of scrapper for better shining and cleaning.

KNIFE

Advantages:

1. Shapes of the blade and handle are changed using ergonomic and aesthetic concepts in designs.
2. Spring steel was used for making cutter, which has self-sharpening property.
3. Weight of the knife reduced to avoid any harm to the fingers and reduce fatigue to the wrist/arm during operation.



Knife *Rs. 50/-

METAL COMB

Salient features:

1. Uniform teeth space.
2. Teeth thickness reduced.
3. Comfortable rubber handle provided.
4. Coating provided for longer life.
5. Shape of the blade is changed using ergonomic and aesthetic concepts in designs.



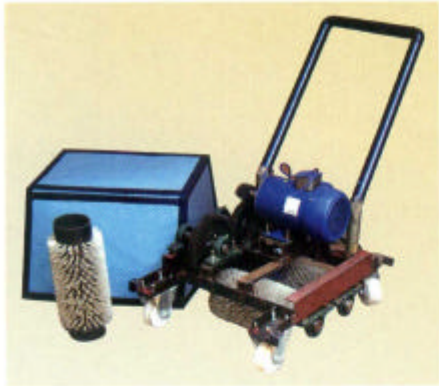
Metal comb *Rs. 150/-

COMPARATIVE STUDY

	Traditional	Improved
Quality	Poor Uniformity is not maintained	Aesthetically and ergonomically designed Standardized parts have been used
Productivity	Less Life is less	More Life is more
Human effort	More Cumbersome to use	Less Easy and comfortable to use

(*subsidy of 75% on tools till March 2003)

MIXING MACHINE



Mixing Machine 1.6' x 2' x 6' Rs 20,000/-

The mixing machine primarily consists of two soft-bristle brushes, mounted on two rollers moving in opposite directions.

Salient features:

1. Soft brushes mounted on two rollers that rotate in opposite directions provide proper chemical mixing.
2. The brushes thoroughly remove all dirt from the carpet.
3. The piles are opened in both the directions in single movement of the machine.
4. Due to the constant speed of mixing brushes, mixing is uniform.
5. Quality of washing and mixing is much better.

SCRAPPING MACHINE



scrapping machine 3'x2'x2.5' Rs. 35,000/-

Salient features:

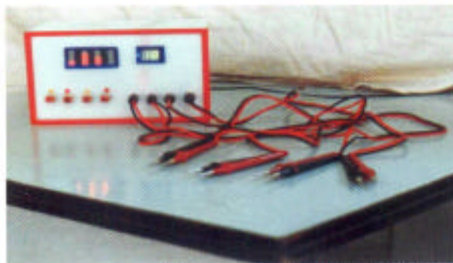
1. Speed of the scrapper is same as that of manual speed of scrapping.
2. There is no vibration.
3. The machine is supported on 5 wheels; front wheel is powered.
4. A long life reduction gearbox is provided.
5. A single person can easily handle the machine.

Basic Components

Electric Switch, Handle, Pantograph Mechanism, Coupler, Bearing Block, Scrapper Pad, Chain Drive, Pad Cover, Electric Motor, Reduction Gear and Driving Wheel

COMPARATIVE STUDY OF MIXING & SCRAPPING MACHINE

	Traditional	Improved
Quality	Pile opening is less Orientation is not proper Chemical spraying is not proper	Pile opening is more Orientation is proper Chemical spraying is proper
Productivity	More man hours required	Less man hours required
Human effort	Hazardous chemical comes directly in contact with skin	Safe



Moisture measuring device 9.5" x 7" x 6.5" Rs. 9,500/-

Basic Components

Graphical Display, Digital Display, Box, Probe Selector, Probe Outlet and Probe

MOISTURE METER

Salient Features:

1. Based on principle of conduction.
2. Moisture of four carpets can be tested at a time.
3. Digital meter is calibrated on normal scale whereas graphical display shows reading from 0 to 30 on logarithm scale as this is the crucial stage of carpet drying.
4. Low Cost.

*Comparative study: Nil (This is developed for the first time)

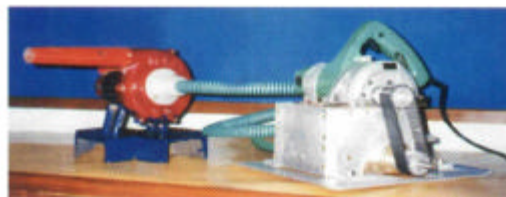
TRIMMING MACHINE

Salient Features:

1. The frame is of aluminum to reduce weight of the machine.
2. Timer pulley and belt are used for accuracy.
3. High-speed steel helical cutter is used for finer cutting and more efficient process.
4. Blower is used to suck out the cut piles from the machine.

Basic Components:

Frame, Base Plate, Timer Belt, Motor Blower, Blower Base Support, Timer Pulley, Helical Cutter, Cutting Guide Plate and Flexible Pipe



Trimming device 16"x11"x10" Rs. 10,000/-

COMPARATIVE STUDY		
	Traditional	Improved
Quality	Pile length is not uniform	Pile length is uniform
Productivity	Requires more time, slow action and difficult movement	Less time to cut the piles fast action, easy movement
Human effort	More human effort for the same action	Less effort as movement and action is fast

SQUEEZING MACHINE



squeezing machine 12'x3'x3' Rs. 25,000/- *with trolley & motor

Salient Features:

1. The machine is both motor as well as manually operated.
2. The height of the rollers from ground is reduced to the desired level for facilitating easy feeding to the rollers.
3. Amount of water squeezed out is approx. 30 - 50%, depending upon the quality of the carpet being squeezed.

Basic Components:

Squeezing Roller, Wheel Handle Structure, Worm Gear Trolley, Base Channel Trolley, Hand Wheel, Trolley, Loading Trolley, and Unloading Trolley

COMPARATIVE STUDY		
	Traditional	Improved
Quality	Direction of pile is not maintained	Direction of pile is maintained
Productivity	12 hours is needed to squeeze out water	1/2 hour is required to squeeze out 33 to 50% water
Human effort	more	less

DRYING CHAMBER

Salient Features:

1. Coal/agro waste as the primary combustion fuel & electrical.
2. Improved system for loading-unloading.
3. Provision for re-circulation of air.
4. Room for four carpets for drying at one time.
5. Running cost reduced.

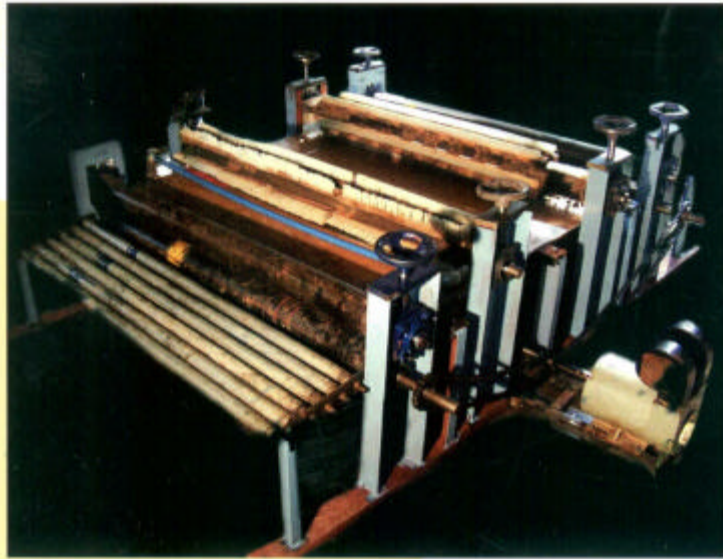
Basic Components:

Heat Furnace, Copper Tube, Blower, Carpet Hanging Frame, M. S. Structure, Fiber Sheet, Circulating Fan, Trolley, Exhaust, Re-circulating Duct, and Chamber.



Drying process 10'x8'x5' Rs. 98,000/-

COMPARATIVE STUDY		
	Traditional	Improved
Quality	Time required for drying is more, depends upon weather conditions, floor space area required depending upon no. of carpets.	Time required for drying is less, independent of weather conditions, floor space area required is fixed, operates on both fossil fuel such as cowdung & electrical
Human effort	more	less



SEMI-AUTOMATIC WASHING PLANT

Salient Features:

1. Three operations incorporated, Mixing, Scrapping and Squeezing.
2. Two sets of squeezing rollers for squeezing water and chemical, are responsible for carpet movement.
3. Brush roller for chemical mixing & removing dirt.
4. Chemical soaking trolley provided.
5. Chemical and water tanks provided.
6. Recirculation of water and chemical.

Semi automatic washing plant 5.5'x9'x3'Rs. 96,000/-

COMPARATIVE STUDY		
	Traditional	Improved
Quality	Pile opening is less, gloss is less, orientation is not proper, chemical spraying is not proper, weight of person on the carpet affects carpet quality	Pile opening is more, gloss is more, orientation is proper chemical spraying is proper, no weight on carpet
Productivity	Man power required is more, mixing, scrapping and squeezing actions are separate causing more time	Man power required is one, mixing, scrapping and squeezing actions combined resulting in less time
Human effort	Hazardous chemical comes directly in contact with skin more efforts is required	Safe Less effort is required

Your advantage Estimated payback period		
Machine	Payback period	Basis
Loom	One year	Additional cost: Rs. 4,000/- savings Rs. 20/- per working day
Washing plant	Three years	Total cost: Rs.96,000/- savings: two hours/1 carpet, 10 carpets/1 day
Drying chamber	Two years	Total cost: Rs. 98,000/- per drying chamber monthly income: Rs. One lakh/month Turnover: 10 carpets/day, 13 during 3months./year (monsoon/winter).

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Marketing by:

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