Making Leather: AN OVERVIEW OF MANUFACTURE Part 10 of 10

<u>Annex</u>

Content

Making leather: THE TECHNOLOGY OF MANUFACTURE

Making leather: FINISHING TECHNOLOGY TO SPECIFICATION

Schematic 1(a) Schematic 1(b)

Panel 1 Panel 2

Making Leather: THE TECHNOLOGY OF MANUFACTURE Author: Richard Daniels

"Overview" is a tool for technicians. It follows the most common methods of converting cattle hides into footwear leathers, then expands into different leather types, including small skin manufacture.

It makes it clear that different raw materials suit different purposes. It provides broad leather making principles, and gives insight into refinements that are required.

However, for making leather, a better understanding of the role of force is needed, and the way that chemical processes are designed and controlled.

This is the objective of "Technology": it builds upon "Overview" for an improved perception of leather making, its development, and its management. "Technology" is for the Leather Technologist.

Technologists are people who have a good understanding of sciences. However, they apply their knowledge to manufacture instead of taking an academic path. In leather manufacture, these understandings include chemistry, physics and materials science. Other essential areas are sustainability, and the environment. These cannot be separated from responsible manufacture.

Central to "Technology" are the three leather making elements:

- il Hides and skins, and the properties that prevail throughout all procedures.
- ii] Force, and its application throughout manufacture.
- iii] Chemical processes and their management.

It involves:

- i] How these elements interlink.
- ii] Their manipulation to advantage in commercial leather manufacture.
- iii] Sustainable manufacture: more efficient processing, minimised water and energy use, recycling of residual chemicals, and viewing waste as new raw materials.

Making Leather: FINISHING TECHNOLOGY TO SPECIFICATION <u>Author: Paul Evans</u>

The intent of "Finishing" is to provide the technology for leather to meet customer requirements. It needs to provide the technologist with knowledge and the ability to meet both aesthetics and performance to specification. This requires a clear-cut perception, since customers want:

- A blend of surface appearance and uniformity. There should be no skin to skin variation, for both manufacturing and end use.
- Individuality: to create appearance specific for a customer.
- Correct performance, for both the manufacture and the consumer.

This is to be provided through delivering:

- A greater understanding of what leather finishing is able do.
- The science needed to change subjective requirements into objective (or measurable) detail.
- An understanding of customer perceptions: for example, colour, filling, covering, adhesion, brightness, handle and texture.
- Some basic manufacturing techniques. This involves some detailing of chemistry within formulations, physics within applications, and requirements for mechanical operations.
- Knowledge to be able to balance performance, appearance and economics.
- Sustainable clean technology as is understood currently (health and safety, environmental).

Stages of manufacture and procedures Bovine hides: chrome tannage: footwear leathers

Schematic 1(a)

"Overview" ©R.P.Daniels

Stage 1 procedures)

PROCEDURE

	PROCEDURE	
Mechanical operations	Drum operations.	Many internal structures
Chemical processes	(many configurations)	- Drums, mixer-type, tri-
Observations	All chemical processes	- compartmental vessels
Options	¥	Many sizes and designs.
W	1 st Soak	 (weight range specific)
24400004	V	
Stage 1	Green flesh	
	V .	+/- Lime splitting
Removal of unwanted	2 nd Soak	Splitting in the limed
materials from	V V	state offers the best
structure	Unhair + lime	extension of the
0.0747	The state of the s	structure throughout all
and	Lime flesh	procedures until the
Extension of the	Af I less sells	completion of tannage.
structure	+/- Lime split	- Also, maximum choice
structure	V Delime	for use of the flesh split.
	1.70 (1	
	Bate	
	Pickle	+/- Wet sort (pre-samm) Clear identification
	Chrome tannage	of grain defects are possible, due to lack of
	+/- Blue sorting/gradings	- grain compression and
	v	samm indentations.
Stage 2	Samm	+ Blue sort (after samn
Stantor	V	Better assessment for
	Side	area and substance.
Introduction of new	V	Easier handling and
materials into the	Selection: Blue sort	- enables rationalisation.
structure	V	- I eliables l'autorialisation,
3000000	+/- Blue Split	- +/- Blue Splitting
and	v v	Maximum selections for
12700000	Shave	grain quality/substance.
Extension of the	V	gram quantyrousosamoes
structure	Trim	- (+/- trim pre- soaking an
	v v	lime splitting operations
	Neutralise	The spinning operations
	Dye + fixation	
	Retan	(Note: Shave and trim
	1,100,000,000	france orient mile tilli

v

Fatliquor/lubricate

Details set down for broad information only with variations in procedures according to hide classification, plant and equipment, and end requirements.

Stages of manufacture and procedures Bovine hides: chrome tannage: footwear leathers

Schematic 1(b)

"Overview" CR.P.Daniels

PROCEDURE

Stage 3

Removal of water

and

Reconfiguration Into a flattened form with specific properties Samm/set

Preparation for drying.

v +/- Side

(very occasional)

+/- wet stretch/stake

May be used before drying and within drying,

Many alternatives and permutations possible

mechanical operations.

Temperature, strain and

compression significantly

influence final properties

within drying and

of leathers.

Vacuum dry in conjunction with suspension dry (tension free)

(or)

Toggle dry High strain and tension)

(or)

Dehumidification dry (light tension)

+/- Conditioning

Moisture content adjust. May avoid if drying via relative humidity control.

Vibration staking

(may be multiple)

Soften to specification.

Second time drying. (tension free)

Lowering of water content from staking requirement.

+/- Milling

Soften/texture if required.

Crust inspection (assessment/evaluation)

Quality, technical and aesthetic to specification.

Stage 4

Application of finish Structural amendment Finishing operations

(multi-permutations) according to specification and end-use

Formation of new hybrid grain/finish structure. Grain wetting/drying + compression under heat and pressure. Changes in appearance, structure and properties.

Details set down for broad information only with variations in procedures according to hide classifications, plant and equipment, and end requirements.

	Charac		lifferent tannages	
Tannage	Properties of dried leathers (tanned only)	Shrinkage temperature (saturated) and Charge	Dyeing, retanning and fattiquoring (anionic products)	Properties of final leathers and End uses
Chrome	Blue-green colour. Hard and thin.	100C. Cationic	Good dye properties. High uptake of retanning agents and fatliquors.	Very versatile. Very soft to firm. Footwear, auto, furniture, bags, leather goods etc.
Glutaraldehyde	Light yellow brown colour. Soft to medium. Thin with poor retention of shape unless heavily supported by syntans/resins.	Approx 75C. Anionic	Poor dye properties. Poor uptake of retanning agents and fatliquors.	Very soft to firm. Good aging properties. Auto use – mouldings and seats if heavily retanned. Footwear, uphoistery.
Other tannages (Many options)	White to pastel colours range. Moderately soft / firm.	75C - 85C. Anionic	Poor dye properties. Lower requirements for retanning agents and fatliquors.	Soft to firm. Many variations, with mainly glutaraldehyde – type properties.
Light vegetable	Cream to light brown colour. Moderately soft.	Approx. 85C. Anionic	Poor dye properties. Low requirement for retanning agents and fatliquors.	Soft to firm with good shape retention. Well filled leather suited for shoe linings and leather goods. Anti-bacterial properties and warm handle.
Heavy vegetable	Light to red- brown. Firm, with dense structure.	Approx. 85C, Anionic	Dyeing and retaining mainly not required.	Offers excellent shape retention. Suited for soling, harness, belts, moulding and carving.

Panel 2			"Overview" CP. Evans	
	Finis	h variations		
Structure	Category			
Full grain	Aniline	Semi-aniline	Pigmented	
Corrected grain	Aniline	Semi-aniline	Pigmented	