WHAT IS A FORMLINER?
• A finished material used to impart texture or patterns onto concrete

TWO COMMON TYPES OF FORMLINERS
• Polyurethane
  • 10-use, 50-use, 100-use
• Plastic
  • Single-use, low multi-use

POLYURETHANE FORMLINERS
• Benefits:
  • Re-usable
  • Enhanced textures and patterns
  • Flexible
  • Larger sizes = less seams

HOW IT’S MADE
CAD drawings are developed.
These are converted to 3D models for approval.

CNC Milling machines work 24 hours a day cutting the design onto wood to provide a perfect replica.

CNC work completion.

The master mold surface is sealed.
To create large panels, several parts can be joined together.

Master mold is framed.
Constant quality checks ensure positive results.

Finished master is sprayed or brush coated with mold wax.
Liquid polyurathane rubber is poured onto the master and allowed to self level, avoiding air entrapment.

Back surface is leveled.

After 24 hours the liner can be removed. A tube is used to roll the liner and avoid stress to the new liner.

Final QC checks are made.

**PLASTIC FORMLINERS**

- Benefits:
  - Less expensive
  - Some types can be re-used
  - Shorter lead times

**HOW IT'S MADE**
WHO DECIDES WHAT TYPE OF FORMLINER TO USE?

- Designer
- Owner/Developer
- Construction Manager
- Precaster

PARTNERING WITH YOUR FORMLINER SUPPLIER

- Get the formliner supplier involved in the process as early as possible
  - Design phase – discussions with the designer on any apparent limitations from a formliner production standpoint or considerations to be made when using with precast concrete
  - Bidding phase – ensure all questions from the formliner supplier are addressed with the precaster and designer prior to submitting bid
  - Ordering phase – place order with formliner supplier earlier, rather than later

WHAT TO CONSIDER WHEN PLACING FORMLINER ORDER

- Multi-use or single-use formliners
- Shop drawings from formliner supplier
- Proper orientation of pattern
- Wood embedded or loose formliners
- Materials for adhering to production table
- Proper release agent
- Storage area for formliners when received
- Proper application instructions provided

RECEIVING AND USING YOUR FORMLINERS

- Proper storage prior to use
- Lay out and relax
- Review application instructions with production team
- Give the formliners a “once over”
- Apply proper release agent and amount
- Use correct rebar chairs and spacers
- After concrete stripping, check for any defects in the concrete and formliner

HOW NOT TO STORE FORMLINERS
RELEASING AGENTS TO AVOID

• Diesel or any other type of fuel
• Vaseline
• Cooking spray
• Motor vehicle oil
• Only use release agents specifically formulated for architectural concrete

ADHERING FORMLINERS TO PRODUCTION TABLE

Liners are glued to the production table.

PREPARING FORMLINER FOR GLUING

GLUING FORMLINER TO TABLE

FORMLINER SET FOR CASTING CONCRETE

MAKING STOP-OFFS
CUTTING FORMLINERS

HOW TO USE FORMLINERS FOR A CURVED AREA

STRIPPING CONCRETE FROM FORMLINERS: WHAT NOT TO DO

STRIPPING CONCRETE FROM FORMLINERS: WHAT TO DO

REPAIRING FORMLINERS

- Polyurethane formliners can be repaired
  - Sometimes at the precast manufacturer
  - In worst case situations, formliners will need to be sent back to the formliner manufacturer for repair
STORAGE OF FORMLINERS AFTER JOB COMPLETION

• Keep them out of direct sunlight
• Keep them out of inclimate weather
• Store in containers or under black sheeting
• Long-term storage when stacked on top of each other may cause damage to surface texture or pattern
• Loose formliners can be rolled and stored

THE 7 DEADLY SINS TO AVOID WHEN USING FORMLINERS

1. Not using the proper release agent, not enough release agent, or too much release agent
2. Small debris left on production table or formliners that causes a dimple in the concrete
3. Improper storage of formliners
4. Cutting formliners
5. Improper layout or mating of formliners
6. Aggressive stripping of the concrete from the formliners
7. Incorrect adhering of formliners to production table

QUESTIONS?

UNIQUE USES OF FORMLINERS
Design is re-created.

And cast in concrete.

History is preserved.

PROJECT FOR LEGOLAND
PREPARING TO CARVE MASTER MOLD
CARVING MASTER MOLD

RELEASE OF FORMLINER FROM MASTER MOLD – 2 TONS

PRECAST ELEMENT

THIN PRECAST

precast.org/education

NPCA
PHOTO CONCRETE

- High-resolution photo is used
- Photo transferred to special software and converted to 256 shades of gray
- CNC used to mill image onto MDF (master mold)
- Master mold is used to cast photo concrete formliners

In the offset light, the picture is visible

Frontal view - the picture disappears
Mold is prepared for casting concrete.

The final result in concrete.
CREATING IMAGES ON CONCRETE USING RETARDER FILMS

Special plastic films treated with a concrete surface retarder do not require release agent.
Concrete is vibrated and levelled.

The concrete element is pressure washed to remove the surface laitance.

And expose the image as a surface finish, creating a rough and smooth contrast in the concrete.
QUESTIONS?

THANK YOU!