Vision Applied to Scanning

Our Vision of Industry Trends

1990 3D beginning
- Ellipse
- Full Profile

2000 Vision beginning
- Black and white basic detection
- Dry, planed lumber grading

2010 Vision explosion
- Color cameras everywhere
- Basically replace all human inspection needed
1990-2000
3D Full Profile Lineal

- Essentially black and white TV cameras
- Low speed

1990-2000
3D Full Profile Transverse

- Essentially black and white linescan cameras
- Low density readings
### 1990-2000
**Edger with vision instead of full profile**

- LineScan cameras on top
- Wane was detected with 2 colours lighting
- Market was doing square edges
- Having a photo of board, knots were partially treated
- *No pictures found (too old)*

### 2000-2010
**Black and white became faster and cheaper**

- Full profile scanners became faster
- Cheaper prices allowed multiple scanners designs in primary breakdown lines (OLI from Comact)
- Fast speed lineal vision applications were appearing in planer, fingerjoint and flooring
2000-2010 Applications examples

- Comact OLI (Primary breakdown)
- Log rotation optimization
- Rotation correction
- Short skew and slew system

2000-2010 Applications examples

- BorealScan from CRIQ (Canada) in flooring
- WoodEye from Sweden in components optimization
### 2000-2010

**Colour cameras were expensive**

- Colour cameras were available
- However, resolution were not as good as B/W
- Cable length were limited
- Interface card (grabber) were expensive

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### 2000-2010

**Great results in finished product grading**

- Considering price and complexity of high speed colour scan, some high end applications were successful
- In planermill, we can find: Comact with GradExpert, USNR with LHG, Microtec with GoldenEye
Ethernet cameras

- No more stuck on SmartCamera
- Data easily transferred in regular computer
- No limitation in distance
- No expensive interface card (grabber)

Large variety of applications

- Gap control from log feeder
- Rot detection in sawmill
- Board decay from board ends
- Grade sorting in sawmill
- Blue stain and crack from log ends
- And now:  
  **Juvenile wood optimization**
Juvenile wood optimization
Finding the size and position from ends

Examples
Juvenile wood optimization
Assumptions

- Juvenile wood core can be described by an elliptical cone
- It roughly follows curvature of the log
- 3D optimizer get the proper price for board made from juvenile wood, and optimize according to it

Juvenile wood optimization
Getting a picture from ends on lineal conveyor
Juvenile wood optimization
Technically

Leading end, then trailing end

Minimum gap required
Juvenile wood optimization
Physically

Juvenile wood optimization
Video
Juvenile wood optimization

Picture example

Picture from a movie, resolution is not the real one

Juvenile wood optimization

Secondary breakdown

Core is assumed to roughly follow curvature
Juvenile wood optimization
Edger

Top and bottom view is ok when combining the geometry
Or use the ends when cheaper

Juvenile wood optimization
Optimization benefits

- Have juvenile wood isolated in the center cant at primary breakdown
- Have less boards contaminated, reducing their value at secondary breakdown
- Isolated juvenile wood in one board at edger when possible
Juvenile wood optimization

Numbers

- Picture resolution 1mm X 1mm
- On dirty ends, pith can often still be located
- Price 25% of X-Ray
- Speed limitation? Close to photo-radar...

Conclusion

Today, vision provides nice information, at an affordable price

“Get the most for the dime”

It is available now
AMERICAN CHICKENS

MANY AMERICAN CHICKENS

- Consume 1,000,000 chickens / hour
- Export more tonnes than they consume
- Worlds largest chicken exporter
- China, India, etc…
OPTIMIZED AMERICAN CHICKEN

CHICKEN RECOVERY
= 100%

- US CONS 42%
- FOOD MEAL 31%
- EXPORT 19%
- PET FOOD 8%