xparvision

Future-proof container glass forming: actionable data

Istanbul, Glassman 2025

heading for perfection

Challenges in container glass industry!

- Reduce carbon emissions
- Increase competitiveness
- Compensate for knowledge and experience leaving the industry

Common answers…

- Use of alternative energy sources for heating up furnaces
- More recycling, more returnable containers
- Redesigning containers for reducing weight

Forming process is being neglected!

Forming process equals opportunity and risk

- The people dependency is most critical
- The potential gain is 25%

People dependency is most critical

- The forming process
  - Many variables, constantly changing, causing process variations
    - Raw materials, cullet, environmental temperature and humidity, glass condition and homogeneity, wear of metal machine parts
  - Operators must ensure that IS machine keeps producing
    - Swab, job changes, delivery alignement, change of timings settings

- **Training**, **experience** and **organization** determine how well the forming process stays within the natural working range

Potential gain is 25%

- Starting from Pack to Melt (pull/cut) current forming process performance is roughly 85%

- Pack to Melt does not include glass wall thickness variations, which are a representation of forming process variations, which are the main root cause behind bad containers produced

- Possible reduction of glass wall thickness variations are estimated to be up to 30%

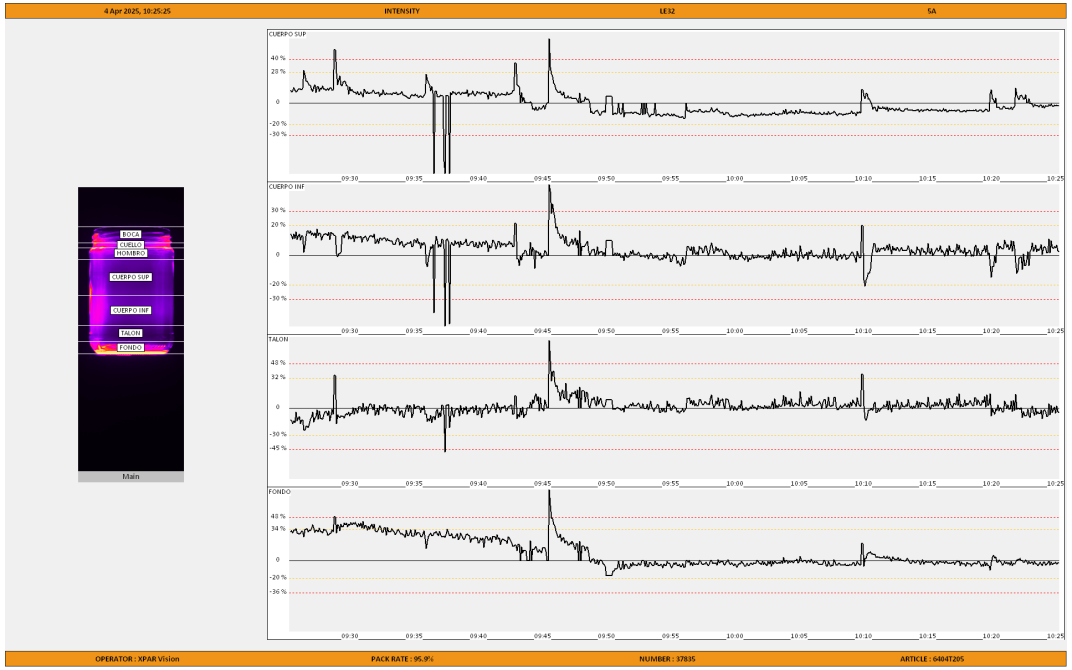
Focus on forming

- We need to produce more good bottles with less …
  - …. energy and materials
  - …. dependency on the knowledge and experience of people

What can XPAR Vision offer…

- > 25 years experience in IR sensing in hot end forming
- Technologists, glass makers and most recently **data scientists**
- The average IR user is focussing on inspection
- For average user IR forming process data is (**was**) difficult to read

IR process data difficult to read



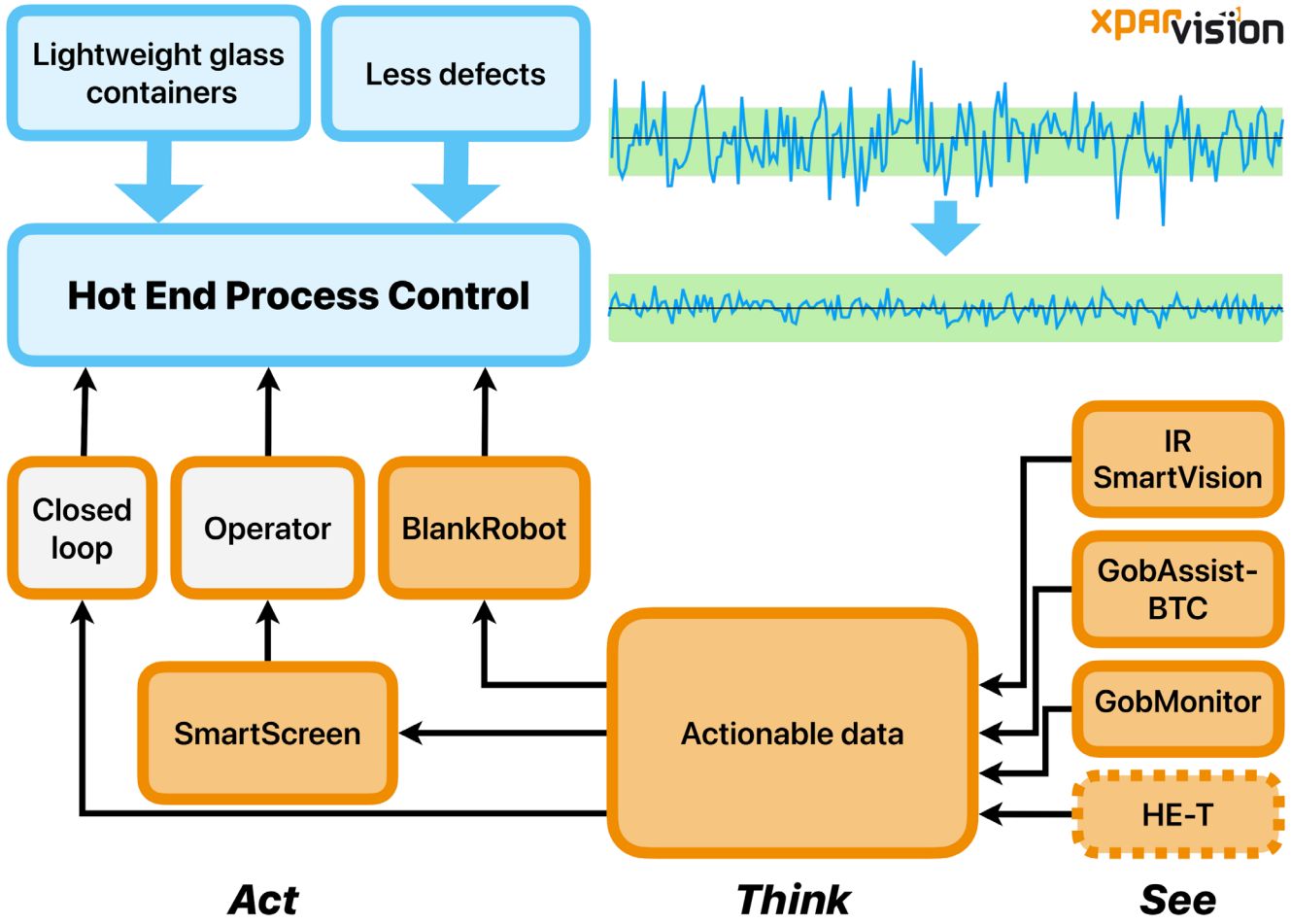
- One cavity, one hour production
- Besides defects detection, up to 32 process data points per container produced
- 32 graphs per cavity, indicating all dynamics of the forming process

Data science can make data **actionable**!

From abstract data to actionable data

- **SmartAdvices:**
  - Statistical trend recognition of single or multiple streams of process data
  - Advices operators to stabilize the forming process
  - Earliest intervention, preventing defects from being produced
  - Virtual consultant for non-experienced operator
  - Resulting in higher level of forming process control

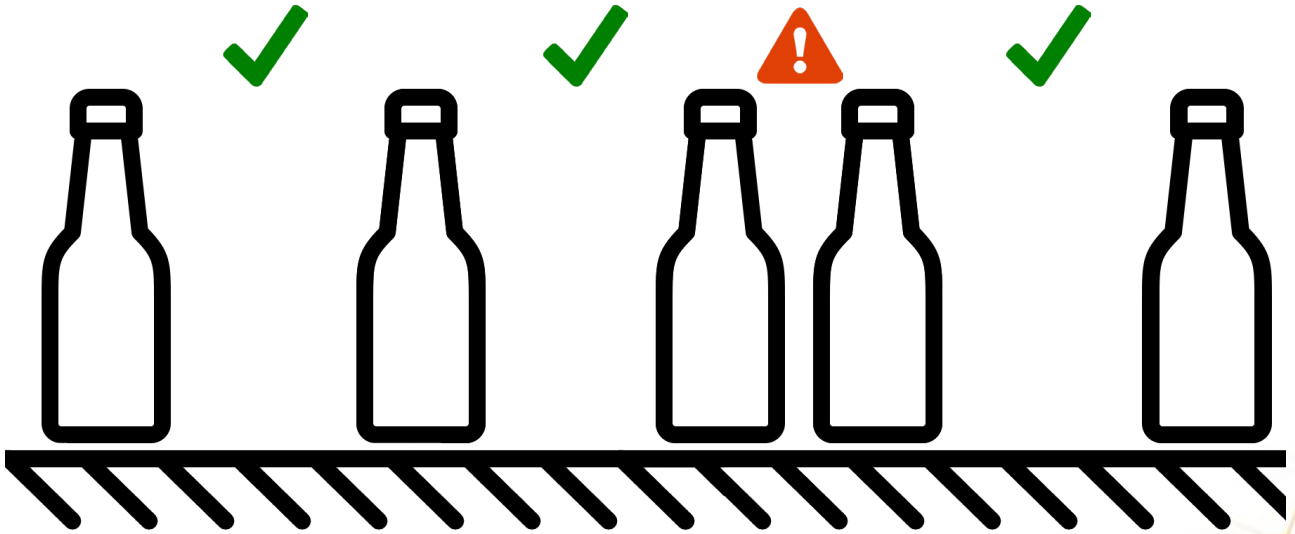
SmartAdvices stabilizes the forming process



- With **SmartAdvices** people dependency in hot end forming is highly reduced
- With **SmartAdvices** the need for IR training is highly reduced

Ware spacing - section

- Measure ideal arrival position of bottles per section.
- If one section is placed too close to the section before/after it -> advise to check the pushout timing.



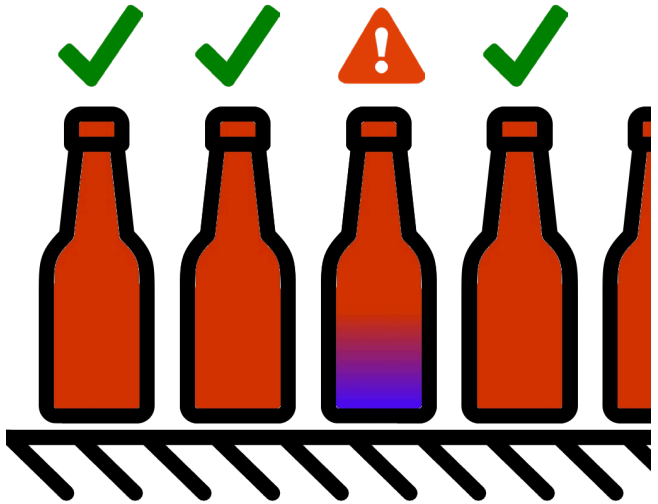
"Set pushout timing later"

Base plate cooling

- Measure infrared intensity of the bottles
- For each cavity, check if the total intensity as well as the intensity in the bottom start to deviate from the machine average.
- Indicates too little/too much heat

  extraction from the bottom ->

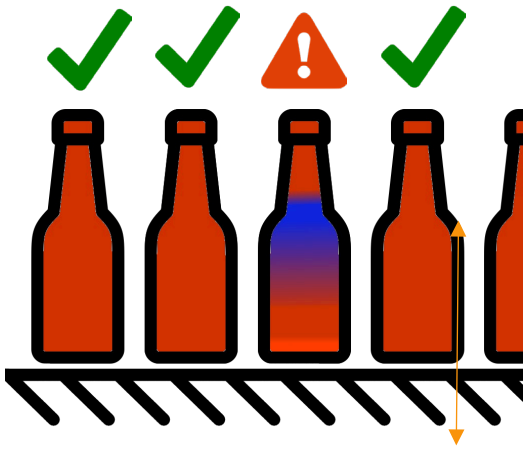
  check base plate cooling



"Decrease base plate cooling"

Gob loading

- Loading issues can be early detected (by a shift in glass distribution)
- GobAssist can provide more detailed advices depending on the root cause



"Check Gob Loading"

Gob length issues → "Check deflector friction"

Gob shape issues → "Check gob shape"

Gob position issues → "Check deflector alignment"

SmartAdvices examples

Process	Metric	Advices
Melting	Intensity, distribution	Glass viscosity, redox
Gob forming	Intensity, gob volume	Weight differences, volume blanks, gob volume (weight changes)
Loading	Intensity, distribution, gob-length, -position and shape	Check final blow process, cooling, contact-time, section-timing
Cooling	Intensity, verticality	Baseplate cooling, vacuum valve
Transport	Spacing variation	Check belt, pusher timing
Machine mechanic	Intensity, distribution	Sticky valves, valve failures

In conclusion

- Focus on forming is required and pays off!
  - Produce more good bottles with less energy/materials
  - Produce with less people dependency
- Actionable data and specifically SmartAdvices is the key to reducing people dependency, whilst forming process control is lifted to a new level
- With actionable data container glass forming is future-proof