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Machine solutions from clever minds


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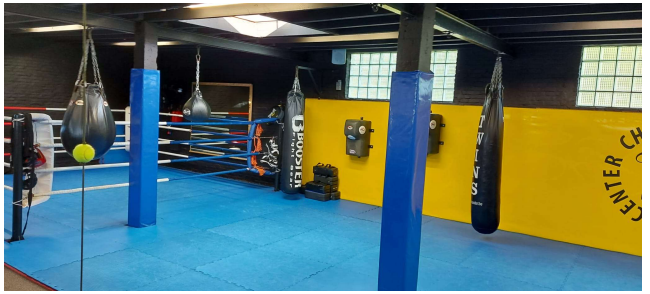
BREAKING BOUNDARIES IN MODULAR PACKAGING: A PARADIGM SHIFT TOWARDS CIRCULAR SOLUTIONS

16/05/2024

INTRODUCTION



CONTENTS

- Equipment lifecycle?
- Cost and environmental evaluation of an equipment investment
- Graniten Flexline platform, and why it was developed from the ground up
- Platform modularity
- Conclusions on circularity

EQUIPMENT LIFECYCLE

- The term “equipment lifecycle” describes the lifespan or longevity of a physical asset. The longer a piece of equipment can be used effectively, the longer it can create value.

- However, in most pharma companies, business cases are calculated on a Return On Investment of 2 to 3 years, while the installed capital assets are written off in 10 to 12 years.

- If we want to move towards a circular economy, we need a better understanding of the machine impact from an economic and an environmental perspective.

EVALUATING A CIRCULAR DECISION: COST

- A pharma company needs new functionality on their existing 10-year-old equipment.
- Making a measured decision, requires data collection on the total cost of the operation:

Replace with new
Purchase cost of new machine
Project personnel cost
Validation of machine
Projected energy cost
Potential missed opportunity cost during lead time

EVALUATING A CIRCULAR DECISION: ENVIRONMENTAL

- A pharma company needs new functionality on their existing 10-year-old equipment.
- Possible environmental impacts to assess for all three options:

Indicator	Unit
CO_2 equivalent mass	kg CO_2 eq.
Acidification Potential	kg SO_2 eq.
Eutrophication Potential	mol PO_4 eq.
Mineral resource depletion	kg Sb eq.
Water depletion Potential	m^3 eq.
Land transformation	kg CO_2 eq.
Eco-toxicity Aquatic	CTUe

A lot to learn

Source: Assessing the Sustainability of Industrial Equipment Life Extension Strategies through a Life Cycle Approach: Methodology and Practical Guidelines, Ludovica Rossi , Deborah Leone , Andrea Barni and Alessandro Fontana

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FLEXLINE PLATFORM

Circular solution from the ground up

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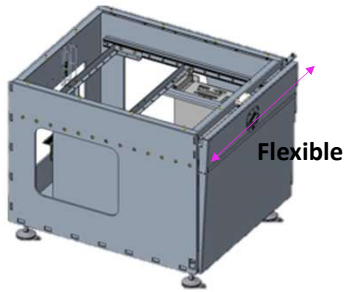
NEW CUSTOMER EXPECTATIONS

- Market demands and more specialized medication result in smaller downstream order sizes.
- In some cases, 70% of batches are less than a few hundred units.

➔ Initiator for Graniten to develop a new packaging platform

PLATFORM DESIGN



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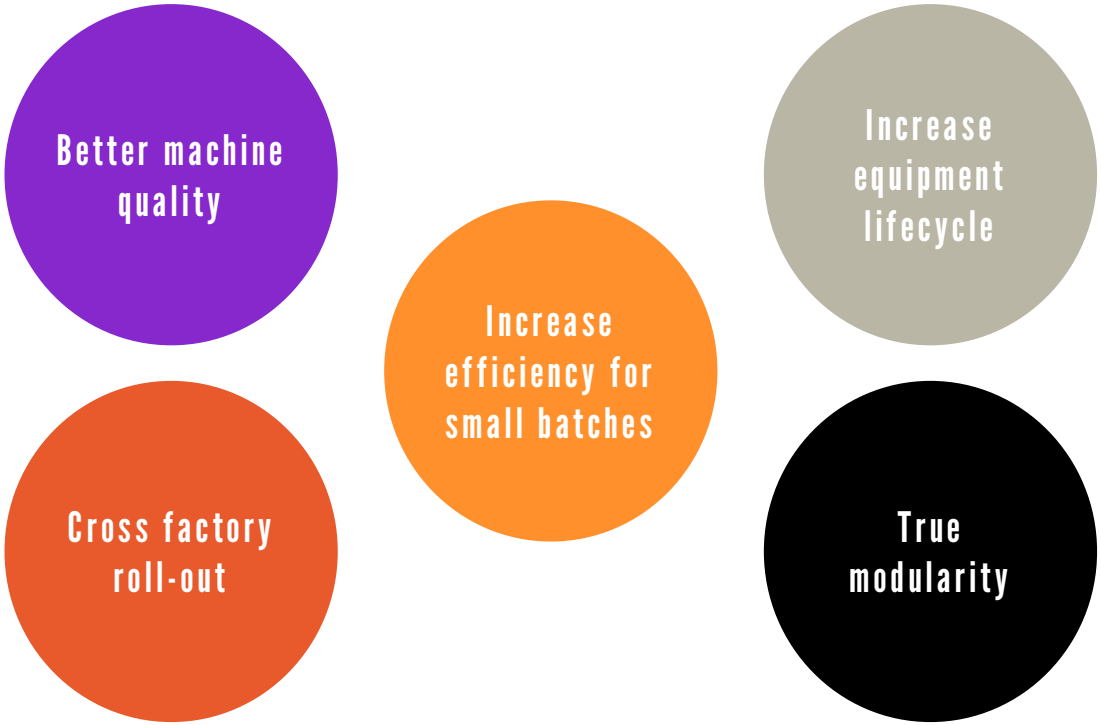
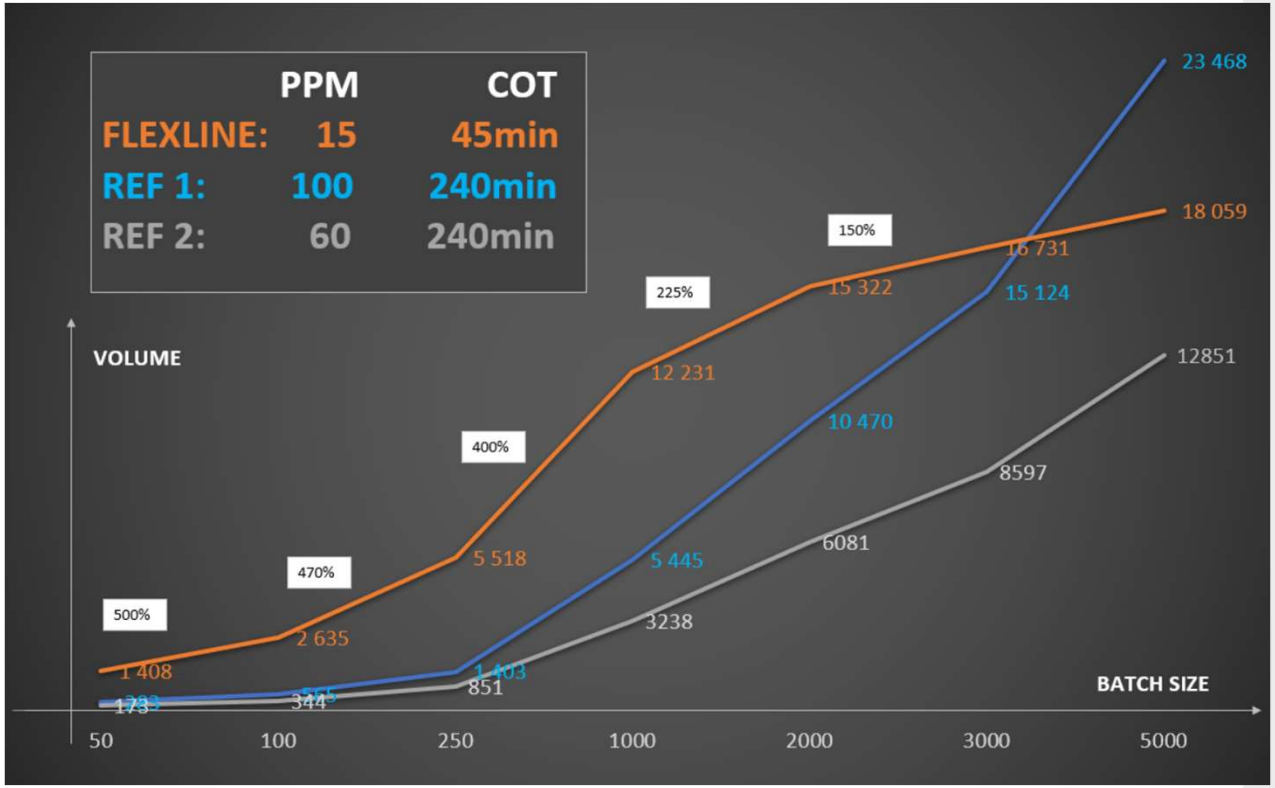
PLATFORM DESIGN



INCREASE EFFICIENCY

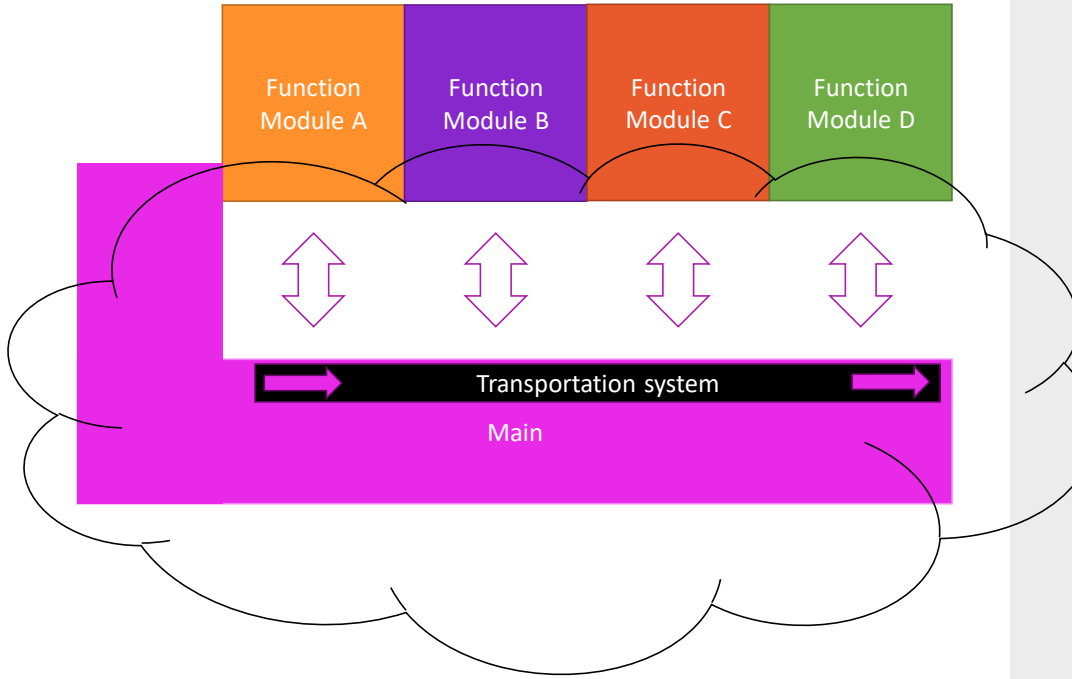
- Use technology that allows fast technical changeover times.
- Use the equipment more!
- Divert small batches to this solution, to improve the overall factory OEE.



*COT includes cleaning, admin, and line clearance

REQUIREMENTS OF TRUE MODULARITY

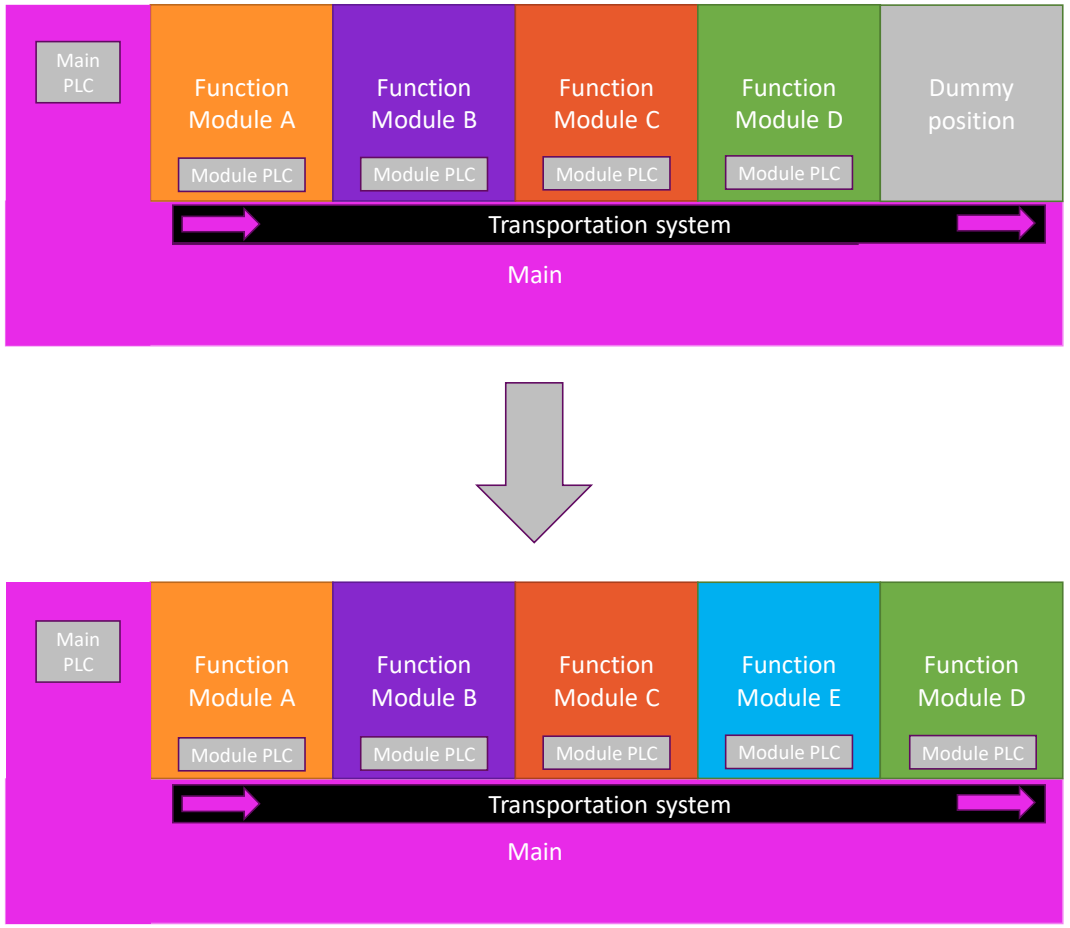
- Possible to place module in **any position** in the frame.
- **No dependencies** between modules, since they are **self-configuring**.
- Products are moved via a **common transportation system**.
- **Possible to move and replace** modules for new requirements.
- **Possible to expand** a cell with additional modules.



Platform = Main + Mech/El/SW interfaces to main in functional modules

CASE STUDY – ADDITION OF ONE MODULE

- No change is done in the main PLC or in the module PLC.
- The new module E can be tested, and validated stand-alone before delivery.
- Only SCADA changes needed.
- Examples of new additions:
  - New product infeed → adding a syringes instead of vials
  - Additional regulatory inspection
  - Different packaging type → topload to sideload
  - …



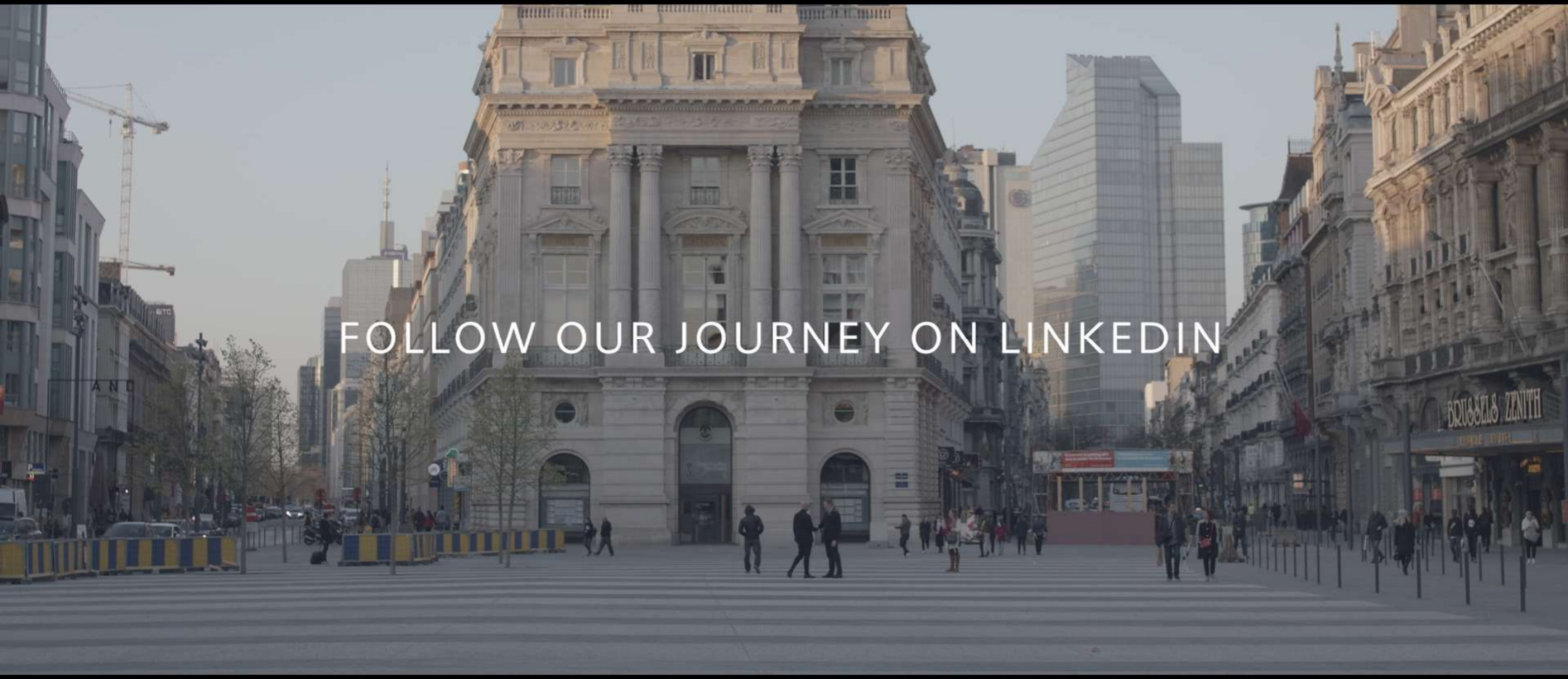
Reconfigurable and swappable modules

CONCLUSION

- Graniten Flexline has been developed from the ground up as a platform, to have a longer equipment lifecycle
  - Main elements can be re-used when adding functionality through modules
  - No complex refurbishing operations
  - Faster validation of new functions

- Use everything 8 times more ➔ circular economy
  - 3-5 times more efficient for small batches * 2-3 longer lifecycle ≈ 6-8 times

- Element that is hardly weighed in equipment business cases, with the current industry evaluation methods
- We are ready for circularity, are you?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GRAPHICS