Design, automation and experiences with defence textile production

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Danish army: infantry 2007

Afghanistan, Helmand Province 2009
tardigrade tactical 2011
Innovation Lab, MIT Sloan,2015

- ”user innovation” Copenhagen Business School

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Design
Manufacturing
Consulting

Equipment for soldiers and Law enforcement officers

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Vests

belts

pouches

packs

special-purpose

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customers

Retailers

- Military
- Law Enforcement

Government

- Special Operations Forces
- Law Enforcement

Industry Partners

- Consulting
- Prototyping
- Production

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core mission

Increase lethality and comfort

-

Decrease ”bulk” and fatique

-

Enhance user experience

(industry partners)

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production

Manufactured in Denmark

-

quick process from idea to prototype

-

Small-batch manufacturing

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Why production in denmark?

Increase end user input for better products

-

Create jobs

-

Proof of concept

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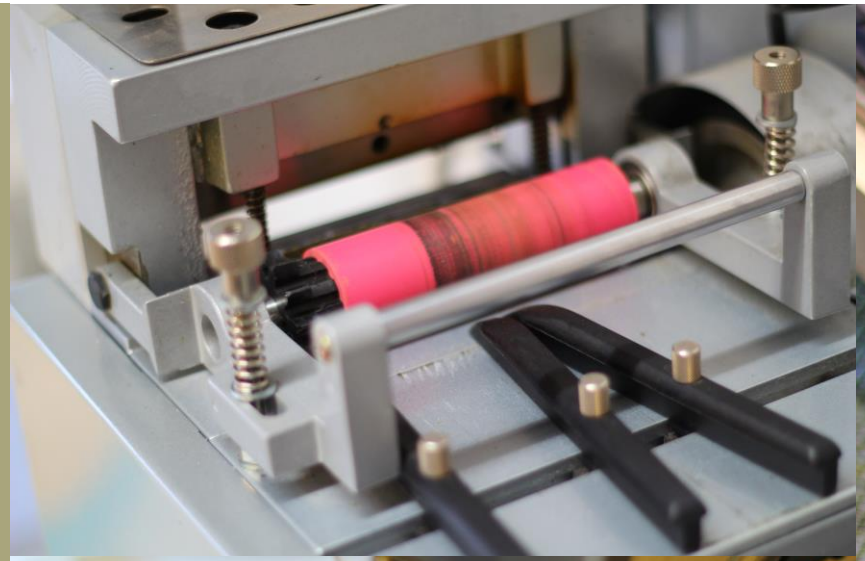
automation

Reduction of time
-
Precision uniformity and quality
-
Operator Motivation



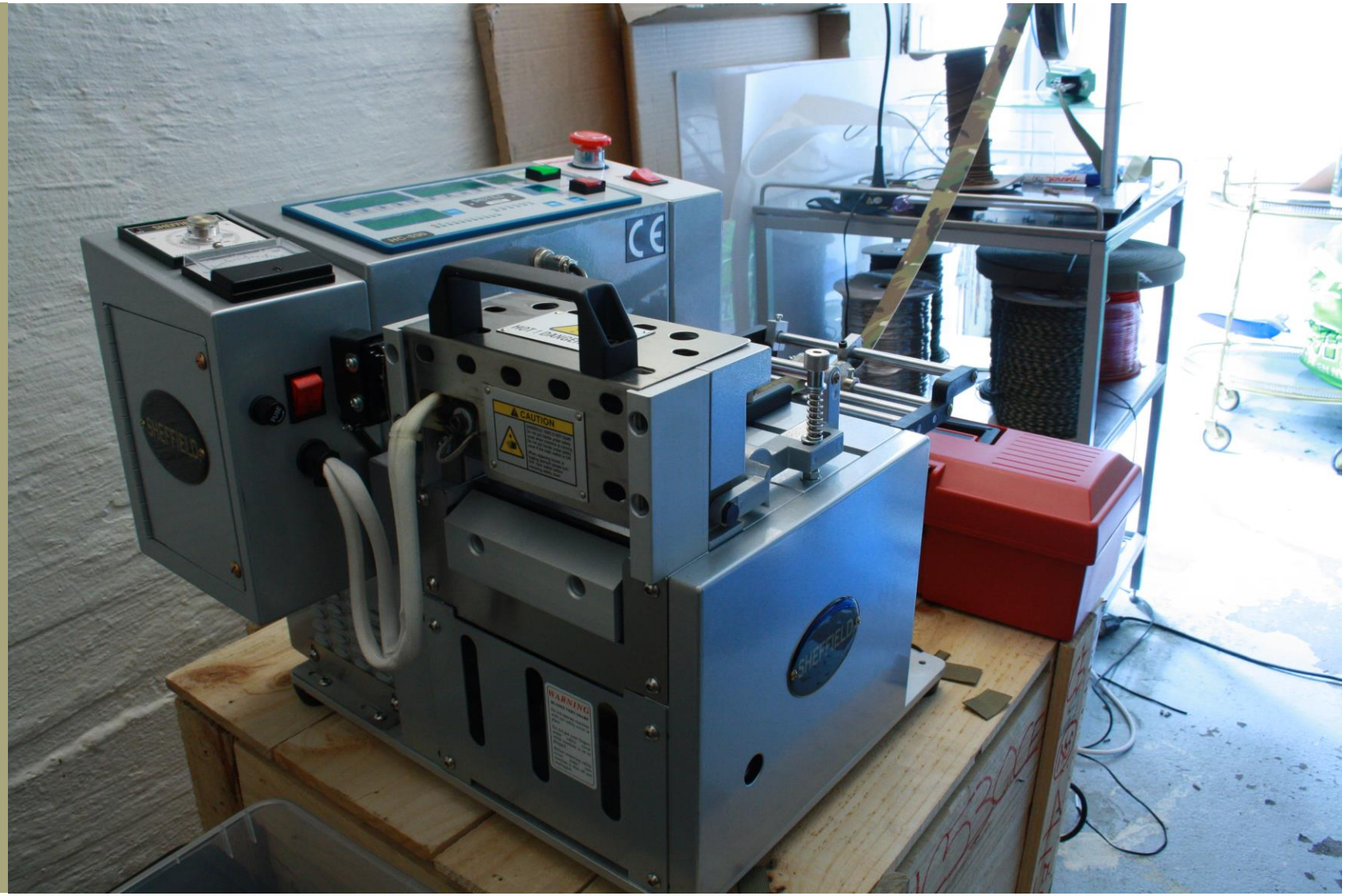
Automatic webbing cutter

-

Hand cut
10-20/min
Precision +/- 1-2 mm

-

Automatic cut
60-100/min
500% increase
Precision +/- 0,1mm



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programmable sewing machines

-

Reinforcing bartacks

-

Increase in production >100%

-

precision

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Laser cutter

High precision

-

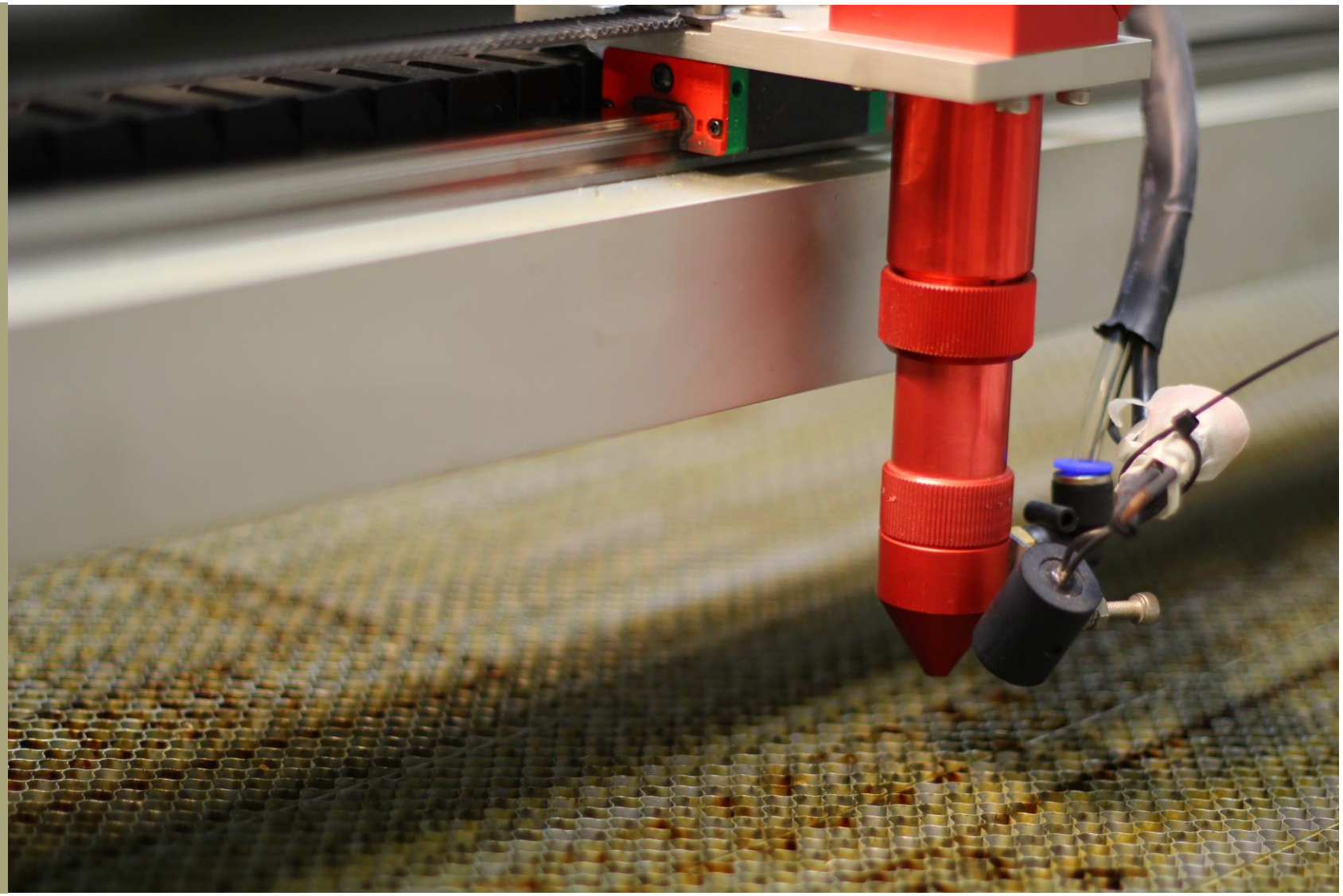
Decrease of waste material

-

New products possible

-

Less post-cut marking



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How much automation makes sense?

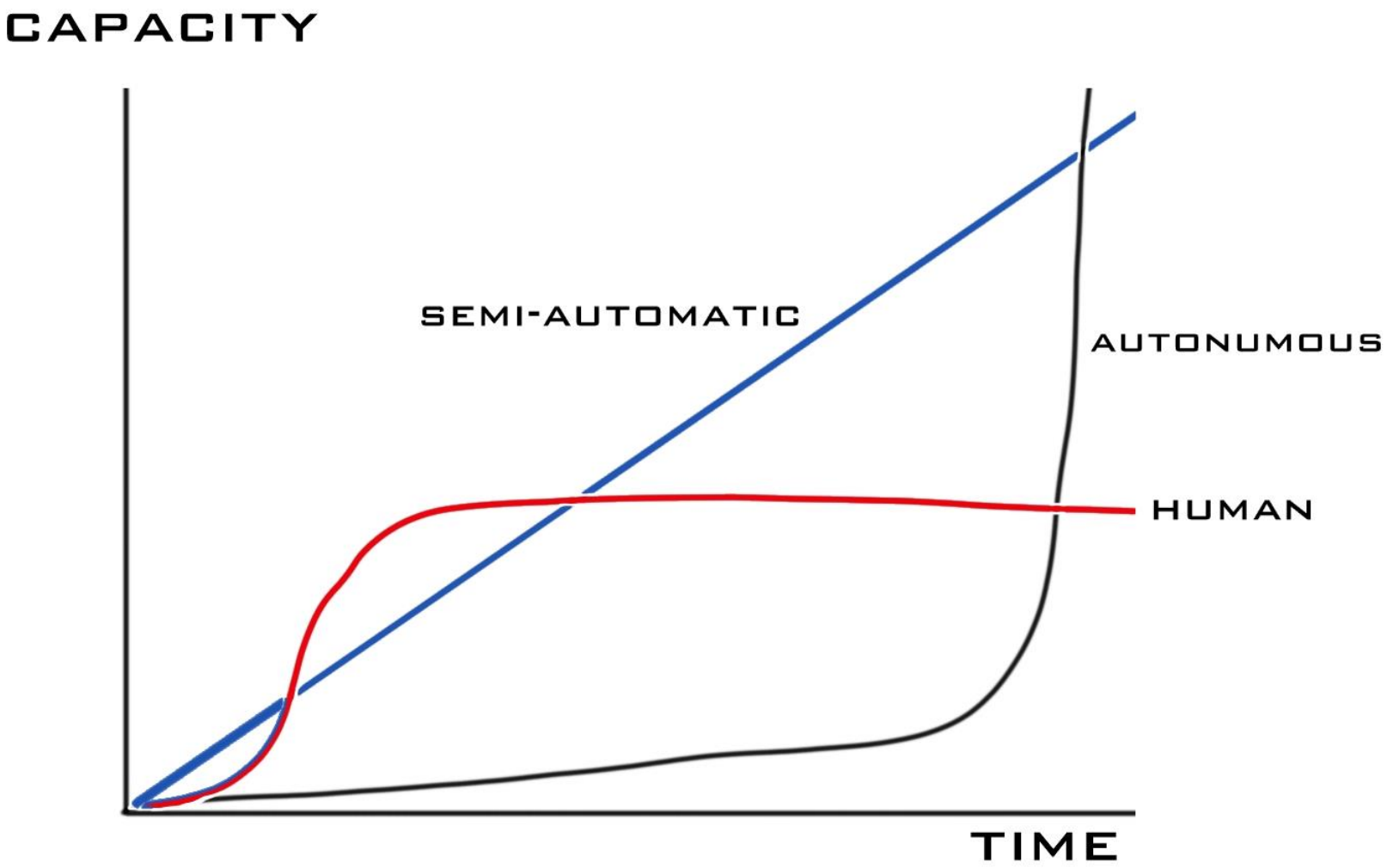
-

Skills vs. Development

(tesla giga factory)

-

Human vs. machine



(Not proportional)

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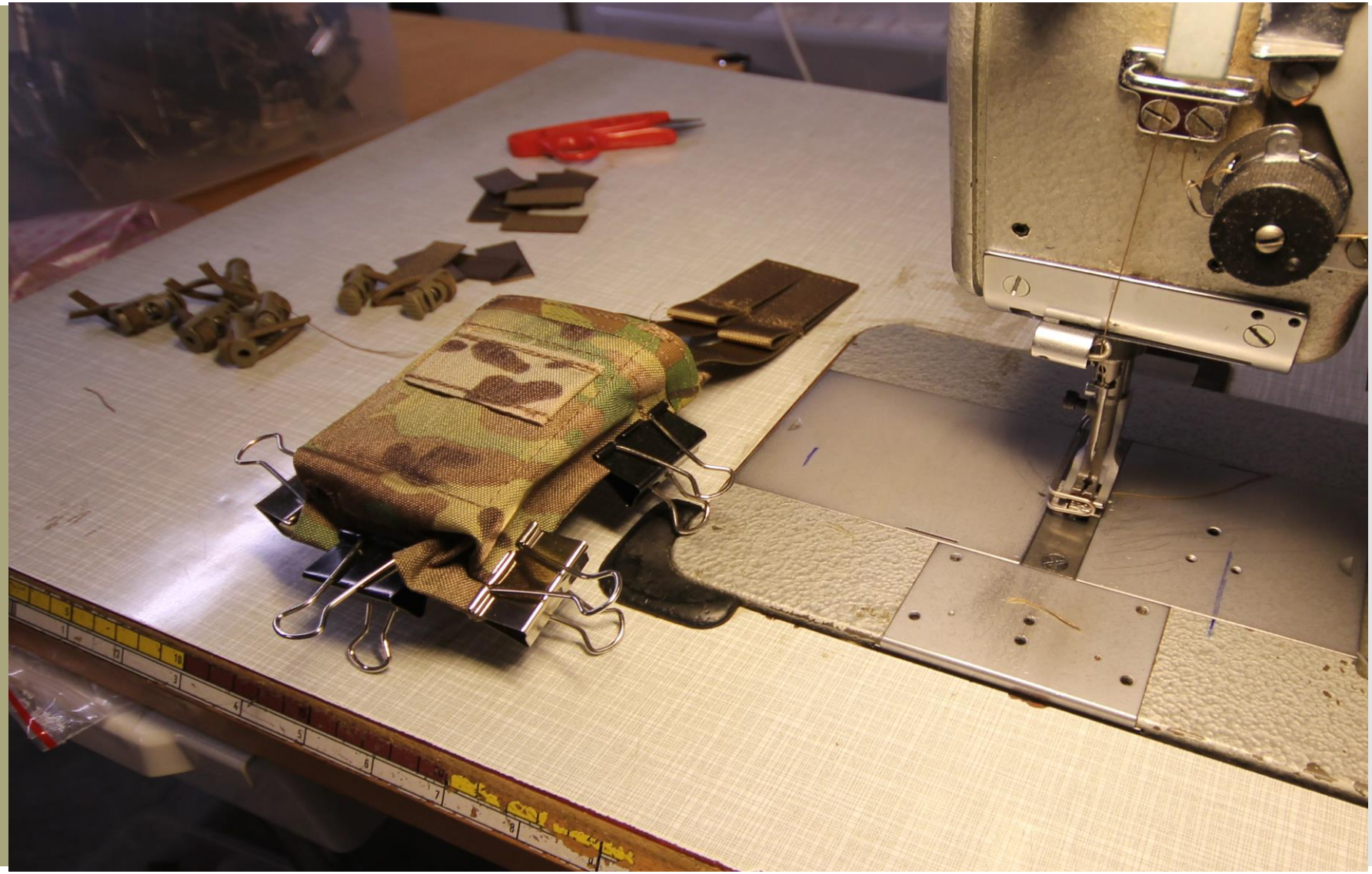
Cost vs. Capacity
–
which production steps should be automated?
-
semi automatic production
-
”flat to 3D”



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Semi automatic CNC sewing machines as the core tool

-

human

-

robot

-

custom clamp development

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Business

will
-
expectations
-
adapting

WILL

Government
Education-mindset on producton and outsourcing

Business
Investment
Patience
Knowhow

Expectations

Expect Lower margins per unit
Realistic mark-ups,
Current on clothing: (3-4x? Higher?)
-
Long term return of investment

Adapting

Branding
-
Quality and durability = less waist
-
”Made in denmark”

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Thank you!

(Questions?)

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