

Dr. Csaba Horváth

Óbuda University
Institute of Media Technology
Budapest, Hungary

REFLECTIONS OF THE “LEAN PRINTING” APPROACH IN THE THESIS WORKS OF GRADUATING STUDENTS

HTWK Leipzig, May 31, 2016

48th Conference
of the International Circle of Educational Institutes for
Graphic Arts : Technology and Management

Google the words

“Lean printing” or „Green printing”

... and you will find a wide range of advice on new manufacturing techniques and methodologies, which will allow your business to operate more productively, more effectively, more profitably and more sustainable.

Enterprise-class *printing* solution | Adobe LeanPrint

www.adobe.com/products/lean-print.html - [Oldal lefordítása](#)

Learn about Adobe LeanPrint, a software-only enterprise-class *printing* solution to reduce paper and toner costs.

[PDF] **Lean Manufacturing in Small- and Medium-Sized *Printers***
print.rit.edu/pubs/picrm200404.pdf - [Oldal lefordítása](#)

Fájlformátum: PDF/Adobe Acrobat

Írta: F Cost - 2004 - [Idézetek száma: 5](#) - [Kapcsolódó cikkek](#)

Rochester Institute of Technology. *Lean Manufacturing in Small- and Medium-Sized Printers*. A Research Monograph of the. *Printing Industry Center at RIT* ...

"Lean Printing" interview Prof Malcolm Keif and Prof Kevin Cooper ...

► 6:01 ► 6:01

www.youtube.com/watch?v=5TAP9Y3tuzc2012. máj. 16. - 6 perc –

Feltöltötte: gsedispensing

Lean management, or driving as much waste as possible out of the workflow, is the buzzword 'du jour' in ...

[PDF] **Impact of Lean Practices on *Printing Companies* - DigitalCommons ...**
digitalcommons.calpoly.edu/cgi/viewcontent.cgi?... - [Oldal lefordítása](#)

Fájlformátum: PDF/Adobe Acrobat

Írta: J Bodolay - 2010 - [Kapcsolódó cikkek](#)

Impact of *Lean Practices* on *Printing Companies*. By. Jenna Bodolay.

GreenPrint

www.printgreener.com/ - [Oldal lefordítása](#)

GreenPrint software makes it easy to lower customer *print* costs... while ...
Powerful Tools to Help Large Enterprises Measure,
Manage, and Reduce *Printing*.

Green Printing Services | Green Printing Solutions | Eco Friendly ...

www.greenprinteronline.com/ - [Oldal lefordítása](#)

Green Printer is committed to bring you the *eco friendly printing* service
with no compromise on service and quality.
We produce a wide range of *green printing* ...

A Nonprofit's Guide to Green Printing

www.techsoup.org/learningcenter/.../page5675.cfm - [Oldal lefordítása](#)

4 Aug 2006 – Are your printed materials harming the environment?
Learn *eco-friendly* ways to make your *print* projects,
the earth -- and your organization ...

Printing Green: 12 Things You Need to Know

www.dynamicgraphics.com/dgm/Article/28468/ - [Oldal lefordítása](#)

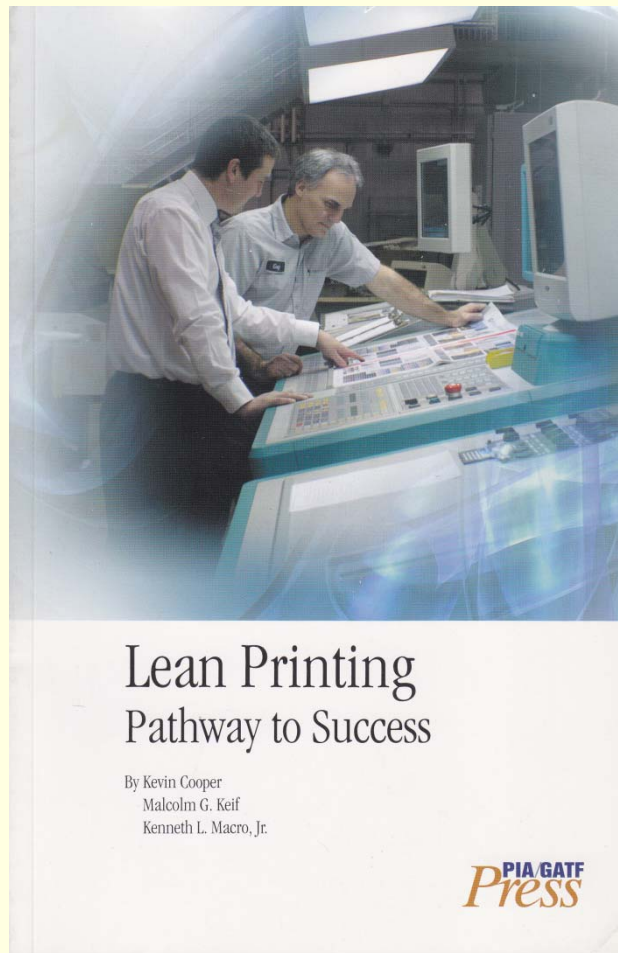
Essential tactics to assure environmental responsibility in *printing* practices.

Green Printer, Green Printing, Eco Friendly Printing Service | Green ...

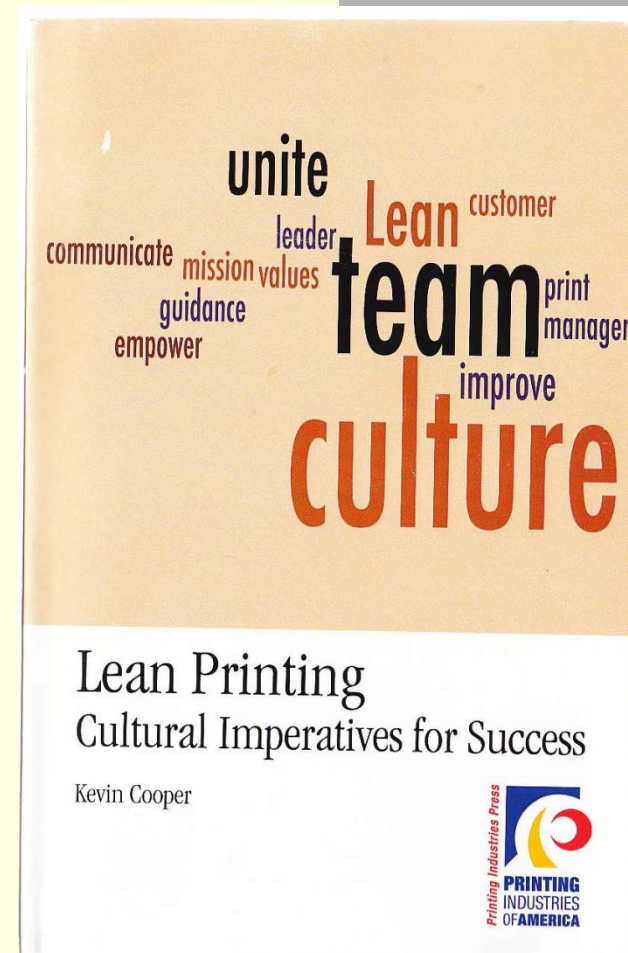
www.printgreen.com/ - [Oldal lefordítása](#)

Green Printer - Green Solutions Printing offers full *eco-friendly green printing*₄
services, including *green printing* with recycled paper and soy ink for postcards, ...

Printing Industries Press Printing Industries of America

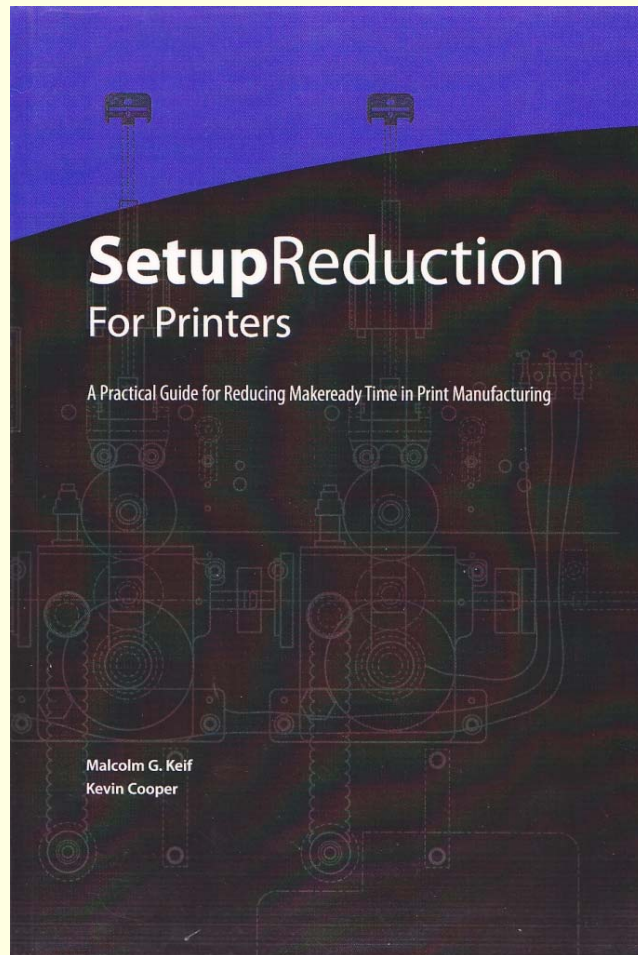


2007

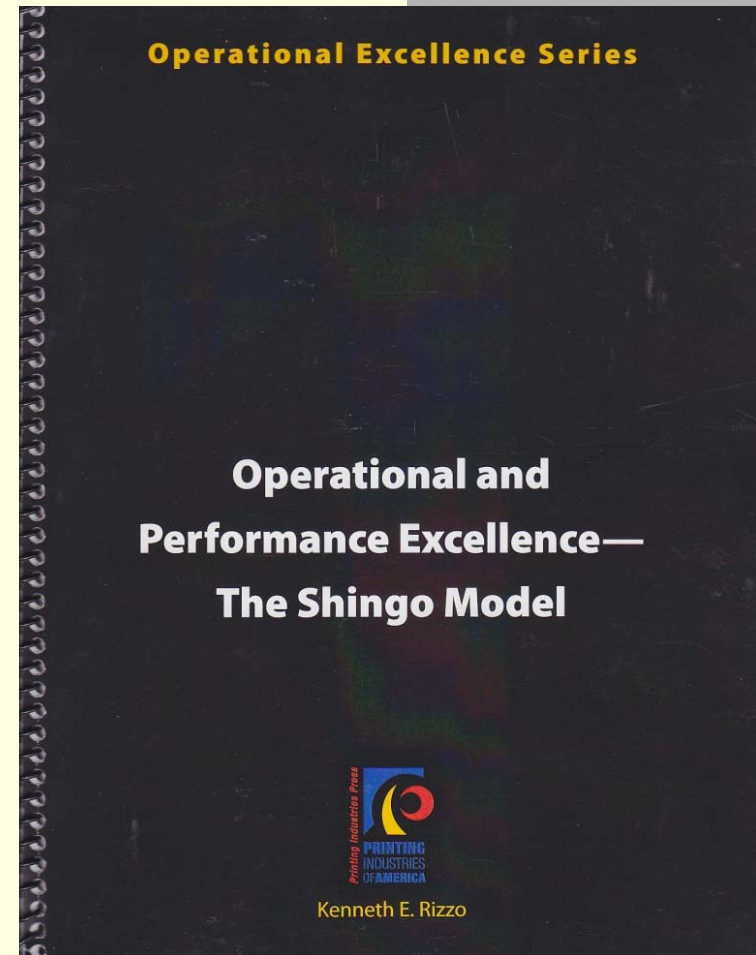


2010

Printing Industries Press Printing Industries of America

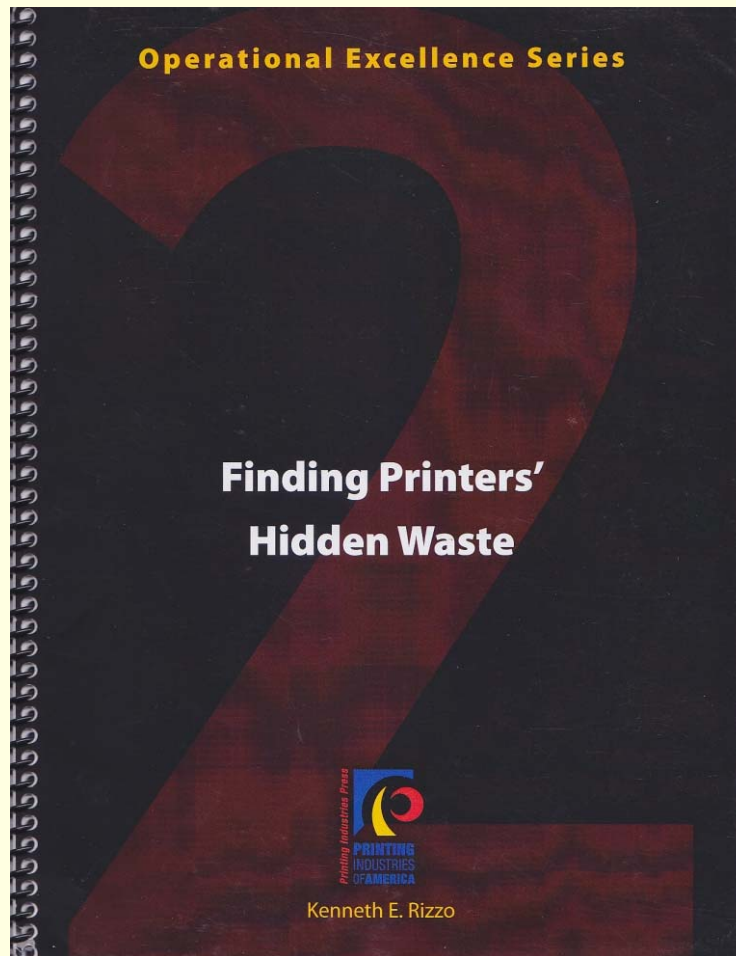


2011

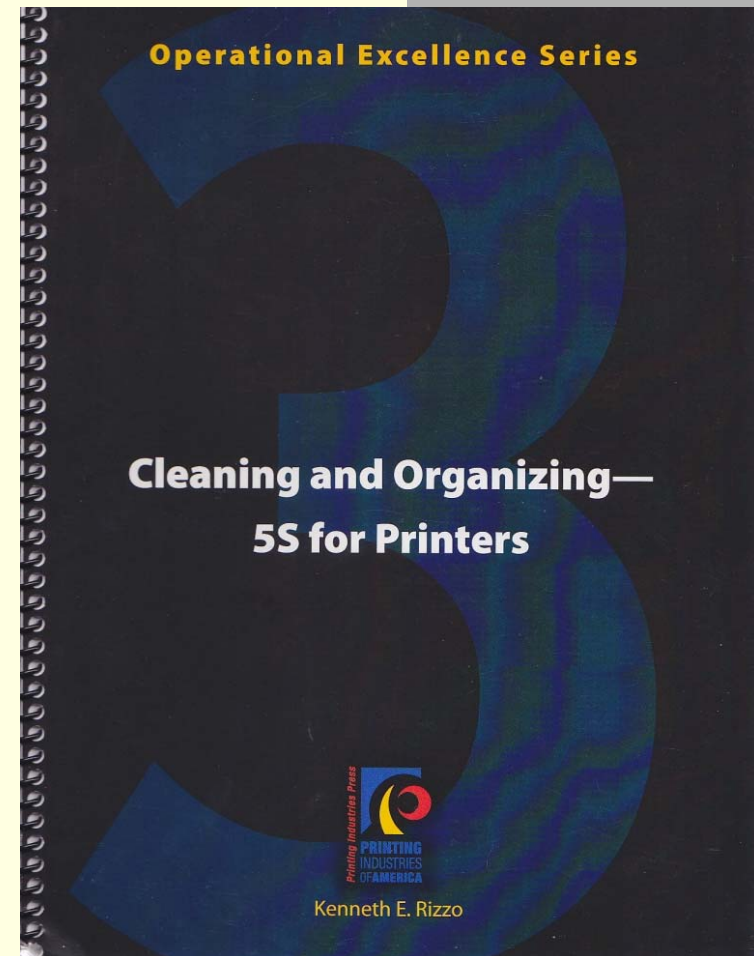


2011

Printing Industries Press Printing Industries of America



2011



2011

PrintCity Alliance



Main events:

- The Pathway to Success: PMA Offers
Lean Printing Seminar in Heidelberg
A hands-on workshop from 27 to 29 April 2011 on how to improve efficiency in print shops
- Joint WPCF - PrintCity
Lean & Green Conference at drupa
2012 May 10th 2012 from 9:00-15:00 at drupa Congress Centre, Room 28
- **EcoPrint Show Europe in Berlin**
September 27-27, 2012
- Joint WPCF –INTERGRAF
Value of Print Conference
June 6-7, 2013 in Amsterdam

Is it a new wave ...

... or pathway to success ?

Danger from market (crisis, overcapacity)

How we set price in the printing industry is different today than it was several years ago?

- We used to calculate price by estimating cost , adding a reasonable mark up, and totaling up for the customer quotation. Both profit and price were variables that the printer had some control over.

The old formula: $\text{Cost} + \text{Profit} = \text{Price}$

- Today, price is largely fixed and determined by the market. Since price is largely out of control of the printer, the way to increase profits is to lower cost .

The new formula: $\text{Profit} = \text{Price} - \text{Cost}$

Communication

Effectiveness (brand Print Power)

Print Power will demonstrate to media-mix decision makers the effectiveness of printed media as a vital channel for marketing and advertising. Famous brands and eye-catching media adverts will be used to prove the effectiveness of print media in newspapers, magazines, direct mail, brochures, catalogues, folders, corporate reports and general business communication.

Danger from marketing of electronic communication

Paperless 2013 (by Google)

- **The Paperless Coalition** — a group of companies who are providing solutions for the Paperless 2013 campaign:
- Google Drive – Cloud storage
- HelloFax – Online faxing
- Manilla – Online bill management
- HelloSign – e-Signatures
- Expensify – Online expense reports
- Xero – Online business accounting
- Fujitsu ScanSnap – The world's best scanners

What is Paperless 2013?

A campaign to remove the need for paper from "paperwork."

Communication

Sustainability (brand **Two Sides**)

Two Sides promotes the responsible production and use of print and paper and dispels common environmental misconceptions by providing users with verifiable information on why Print Media is an attractive, practical and sustainable communications medium

Lean & Green strategy

Lean manufacturing

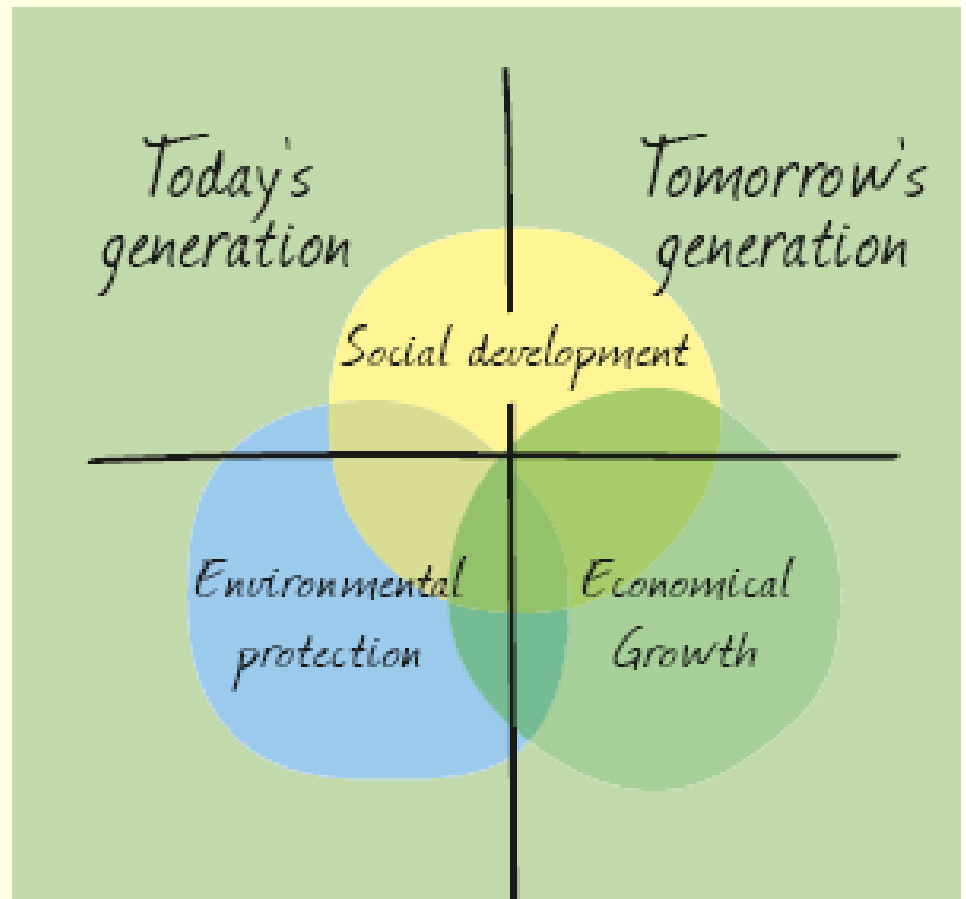
reduces waste to minimise costs and time while simultaneously improving Green performance because any waste reduction provides direct environmental benefits as well as economic efficiency.

Reduction of energy consumption and greenhouse gas emissions also takes a value chain approach. There is a direct correlation between CO₂ fossil emissions, energy generation and consumption.

Sustainability

Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

(Brundtland Report, from the United Nations World Commission on Environment and Development (WCED), 1987)

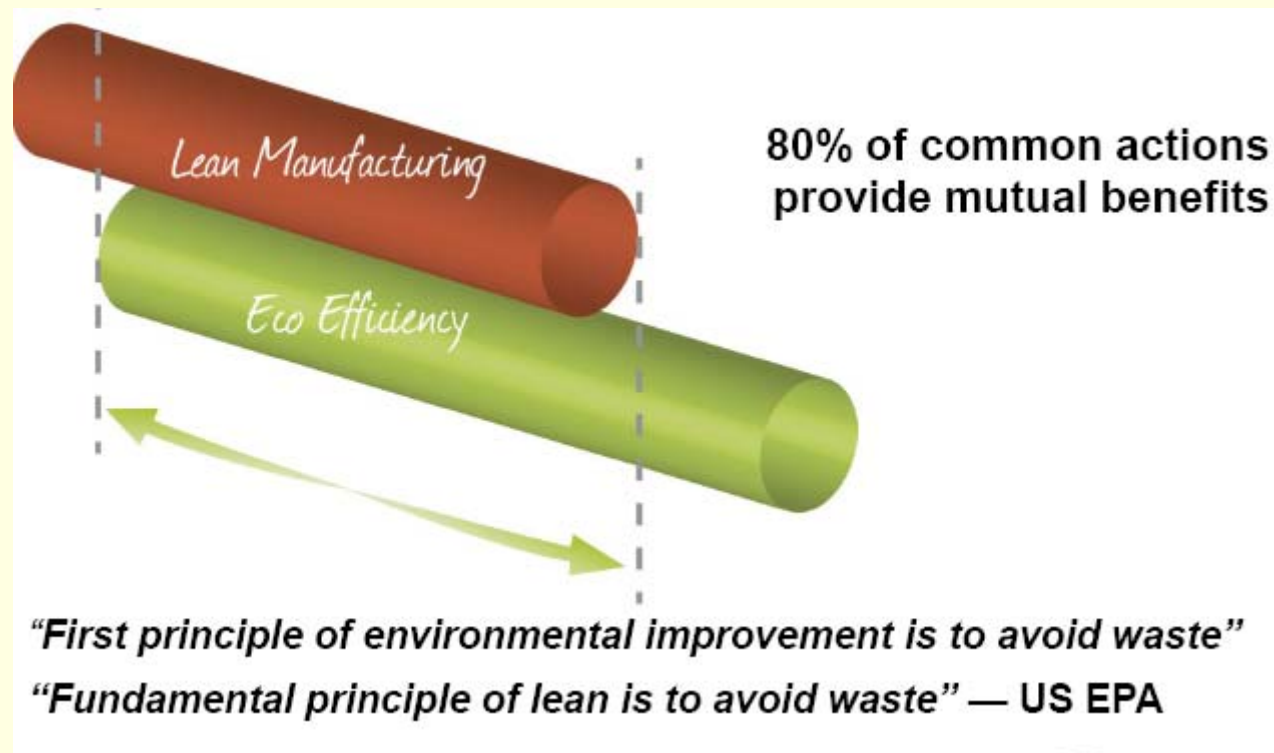


Lean

&

Green

Why lean and green ?



What is the lean ?

Lean Definition of Waste

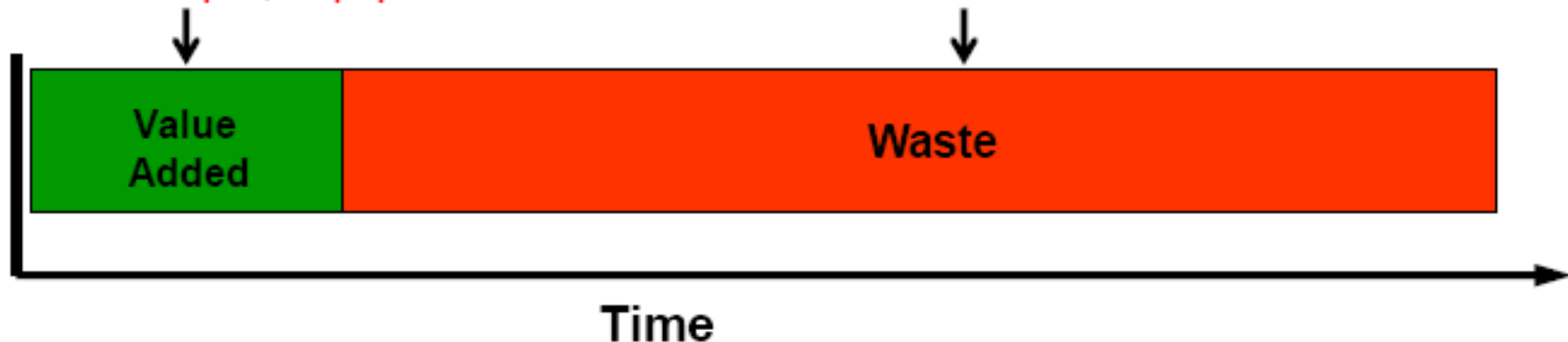
“Any material or activity that does not add value from the customers perspective.”

Traditional Focus

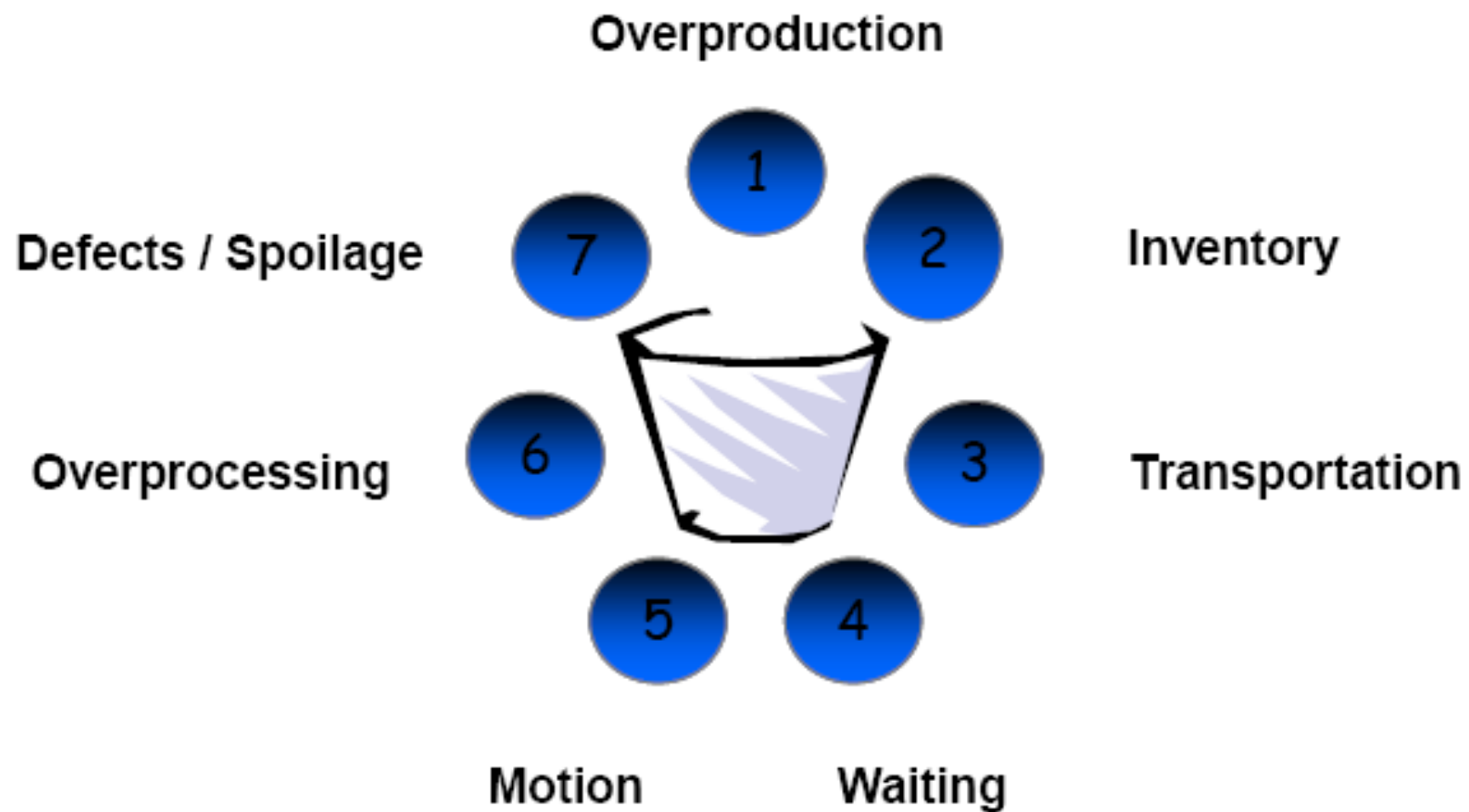
- Work Longer-Harder-Faster
- Add People, Equipment

Best Practice Focus

- Identify and aim to eliminate Waste



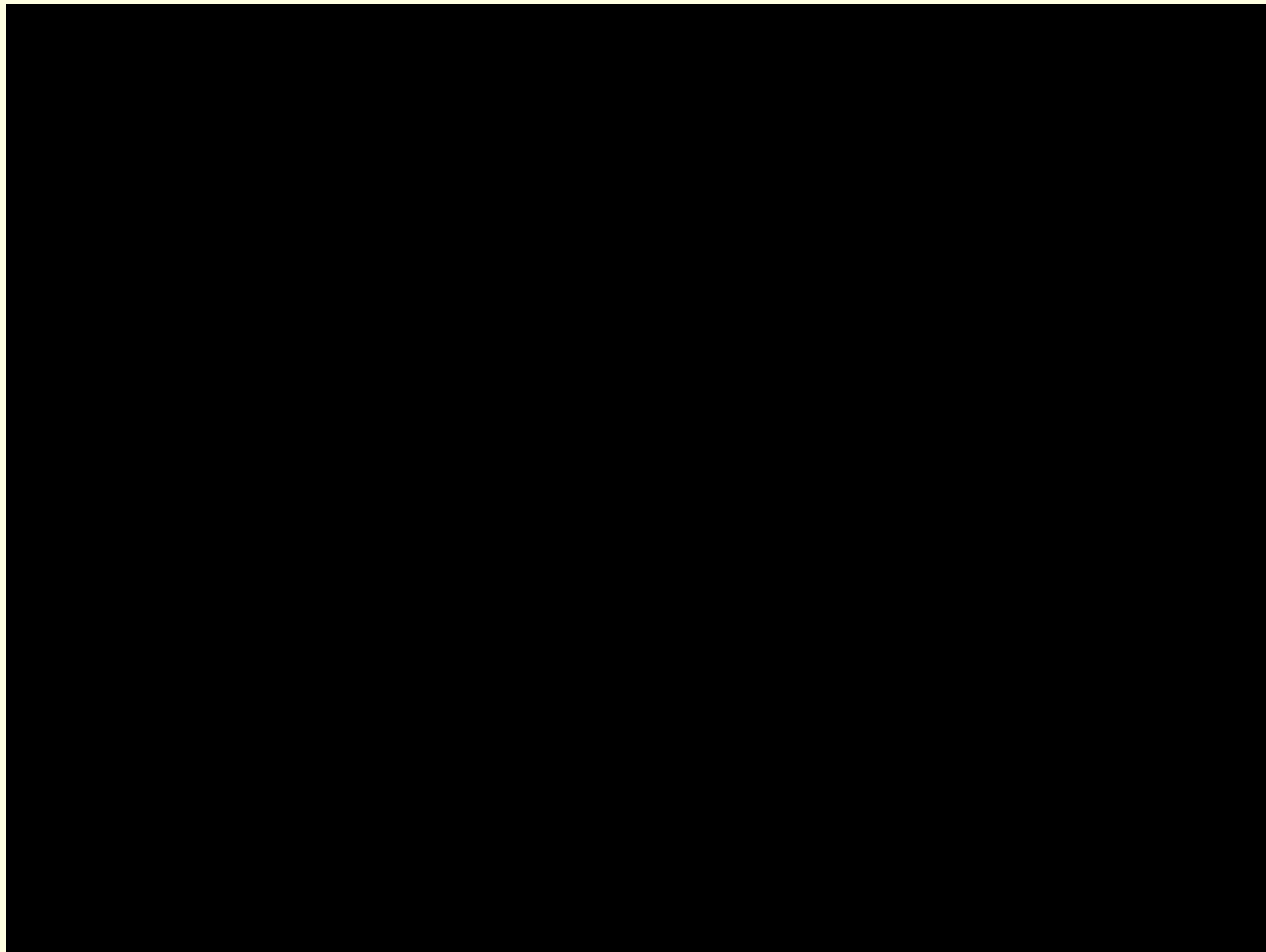
The 7 waste



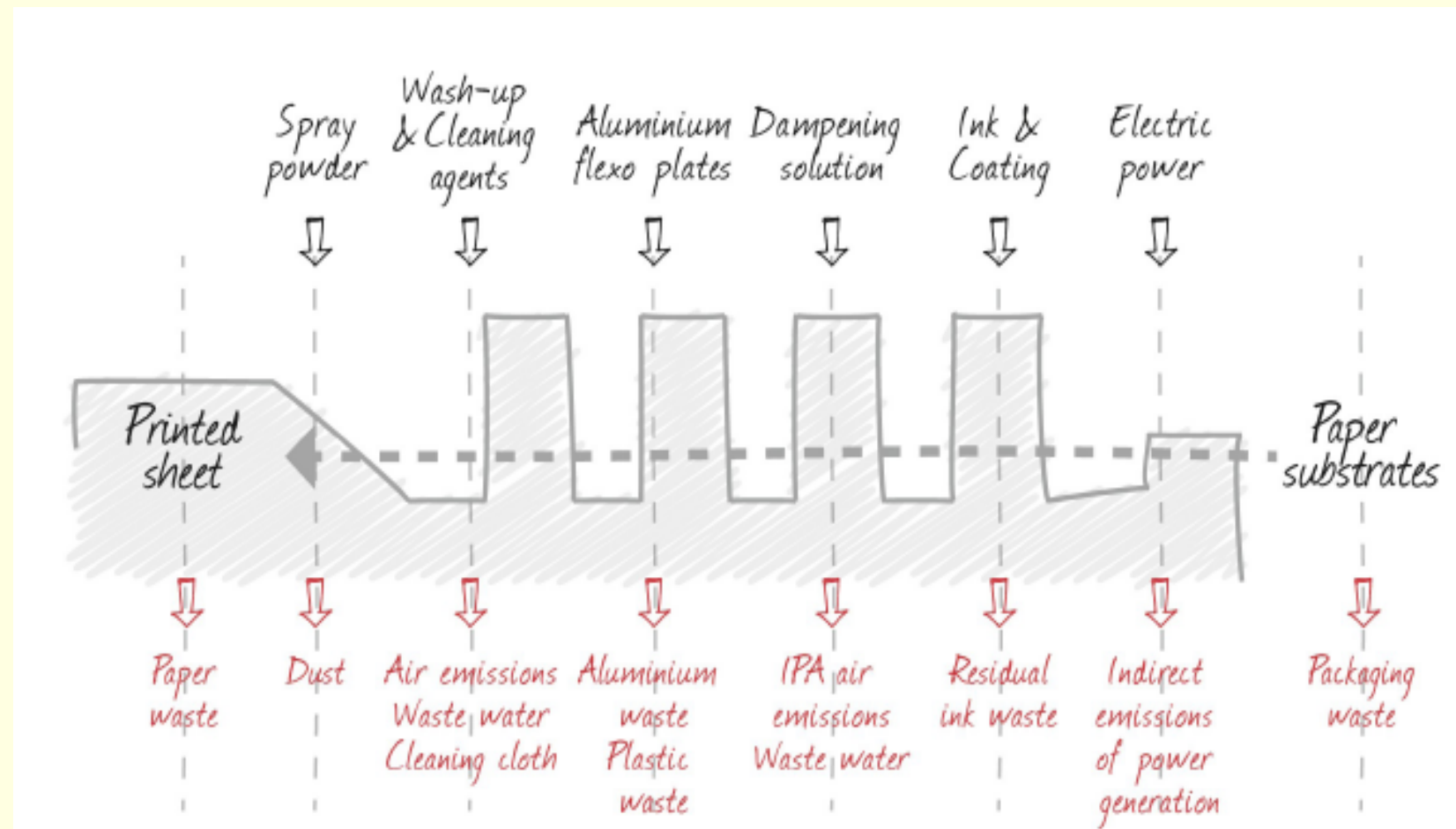
Overproduction is the Mother of all wastes.

What is the lean printing?

Prof. Kevin Cooper and Prof. Malcolm Keif
co-authors of „Lean Printing – Pathway to Success”



Sheet-fed offset print process improvements



Studentworks

- Recently, a company manufacturing packaging materials (cardboard boxes) has purchased and commissioned new sheet-fed presses with state-of-the-art accessories. However, the expected profit has not been pocketed.
- On commission of this company, we have launched our research work in order to find a methodology by which the necessary steps can be explored to turn the application of this modern technology into a business success.
- Our studies have primarily focused on the human–machine environment, analyzing all the activities that are connected with the operation and servicing of the machines. Step by step, we have tried to expose those hindering factors, superfluous or less efficient organizational and management process elements that now increase costs.

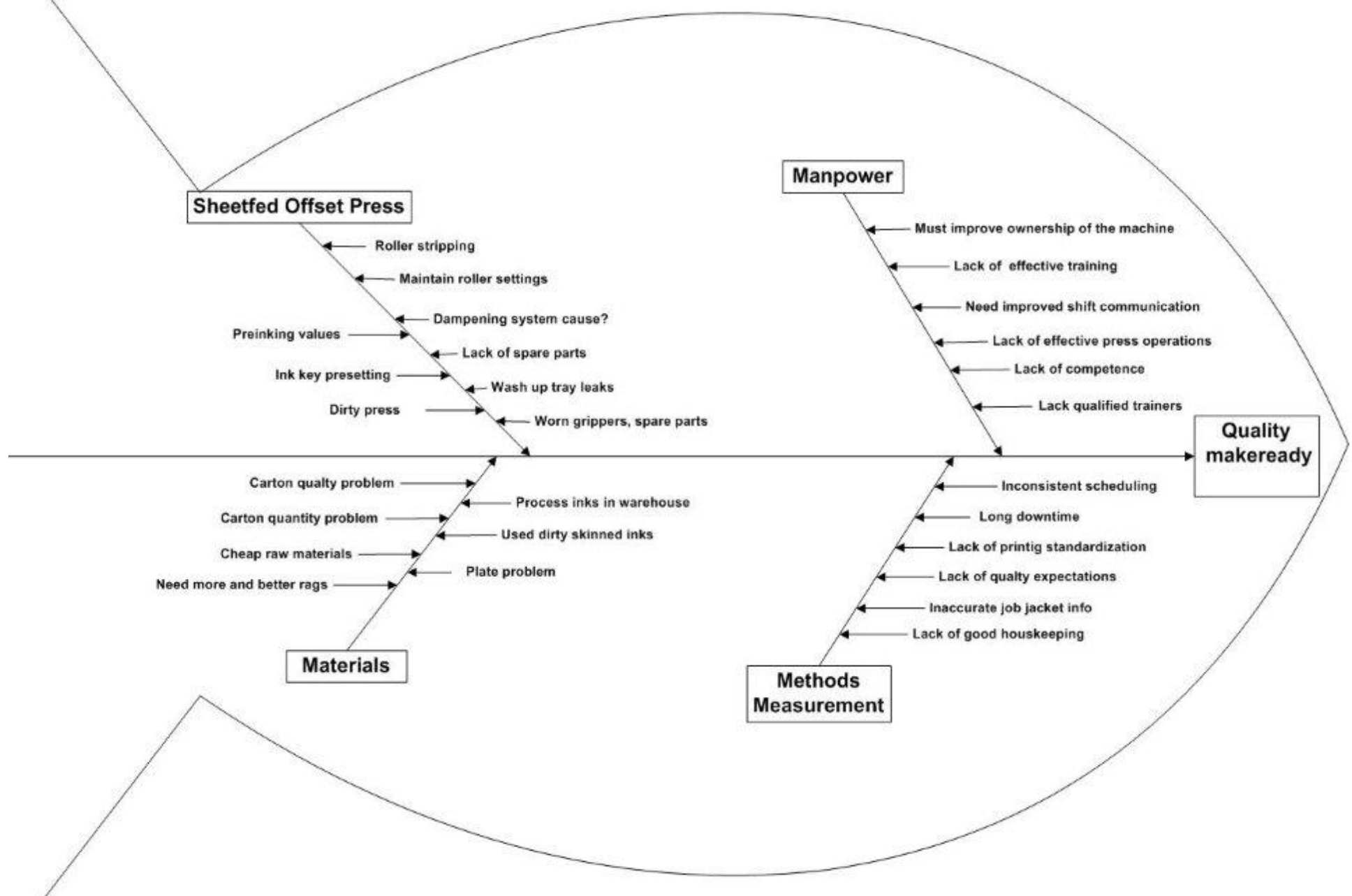
Research methods

- The *SBS way* program aims at the optimization of the printing process. The goal of the project is to improve the utilization rate of the printing machines, minimize time losses (faults, setup times), enhance performance (printing speed) and reduce reject sheets generated in production.
- First, the reduction of the setup time and the number of the reject sheets generated in production was targeted. These were the fields where the necessity to transform the human-machine environment seemed to be the most obvious. In the framework of the investment, the company purchased such state-of-the-art technology whose application allowed the fastest possible setup times. Still, the system failed to operate with sufficient efficiency.

Research methods

- To cut setup times, the SMED (Single Minute Exchange of Die) method has been applied.
- When the setup process is optimized, in fact the following actions are taken:
 - reduction of the number of steps/components to be completed,
 - reduction of the number of setups,
 - improvement of the accuracy of setups,
 - reduction of the generation of rejects.
- To clarify the setup time and unveil the processes, causes of the excess time demand, the Fishbone/Ishikawa Diagram was used.

Makeready Fishbone Diagram



Research methods

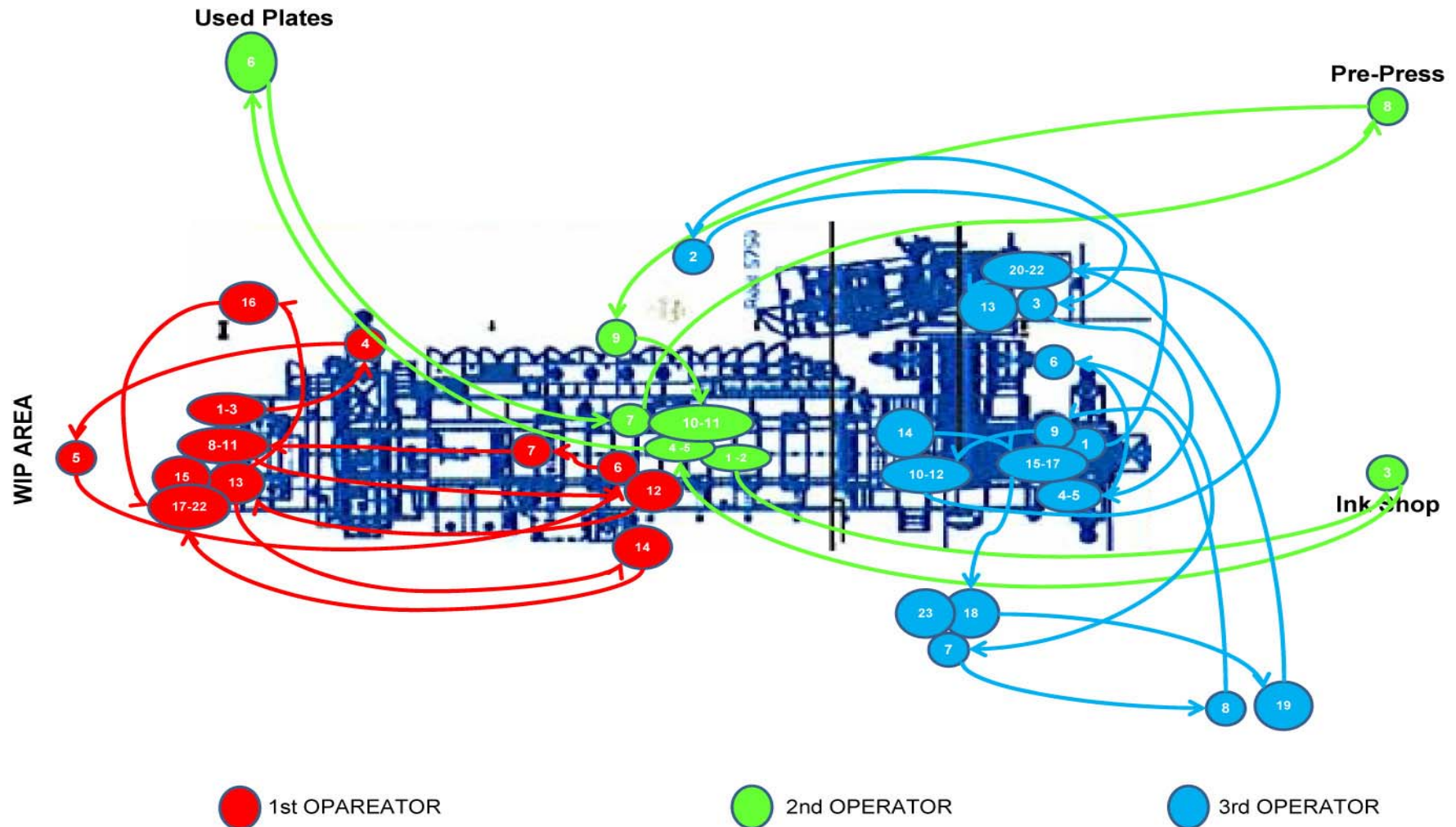
- The SMED makes a distinction between so-called external and internal operations that jointly form the setup process. Internal operations can be executed when the press is in standstill, for instance during the replacement of the die plate. External operations can be completed in the course of the printing of the actual copies, when the printing machine generates marketable products, for example during the preparations for the replacement of the die plate.
- The optimization of the setup time consists of three main phases.
- Phase 1: Separation of internal and external operations.
- Phase 2: Conversion of internal operations into external operations.
- Phase 3: Harmonization of all the elements of the setup operations.

Research methods

- To *separate internal and external operations*, the process of changeover was subjected to value stream analysis by way of making and evaluating a video recording.
- After the making of the recording, the video shots were replayed in the presence of the work team, each of the operations performed was identified, and they were also determined quantitatively (in terms of time). In addition to the video recording, a motion diagram was also compiled in order to visualize and easily recognize losses.

Spaghetti map - current

MOTION DIAGRAM - CURRENT



Research methods

- During the conversion of internal operations into external operations, the following questions need to be answered in the light of the steps that have already been identified.
- What is the purpose of the operation?
- Why should the machine be in standstill to perform the actions?
- Is the operation convertible from internal setup to external setup?
- We tried to form the largest possible number of operations in the external setup, as irrespective of the weight of the operation, thereby minimizing the time loss.

Research methods

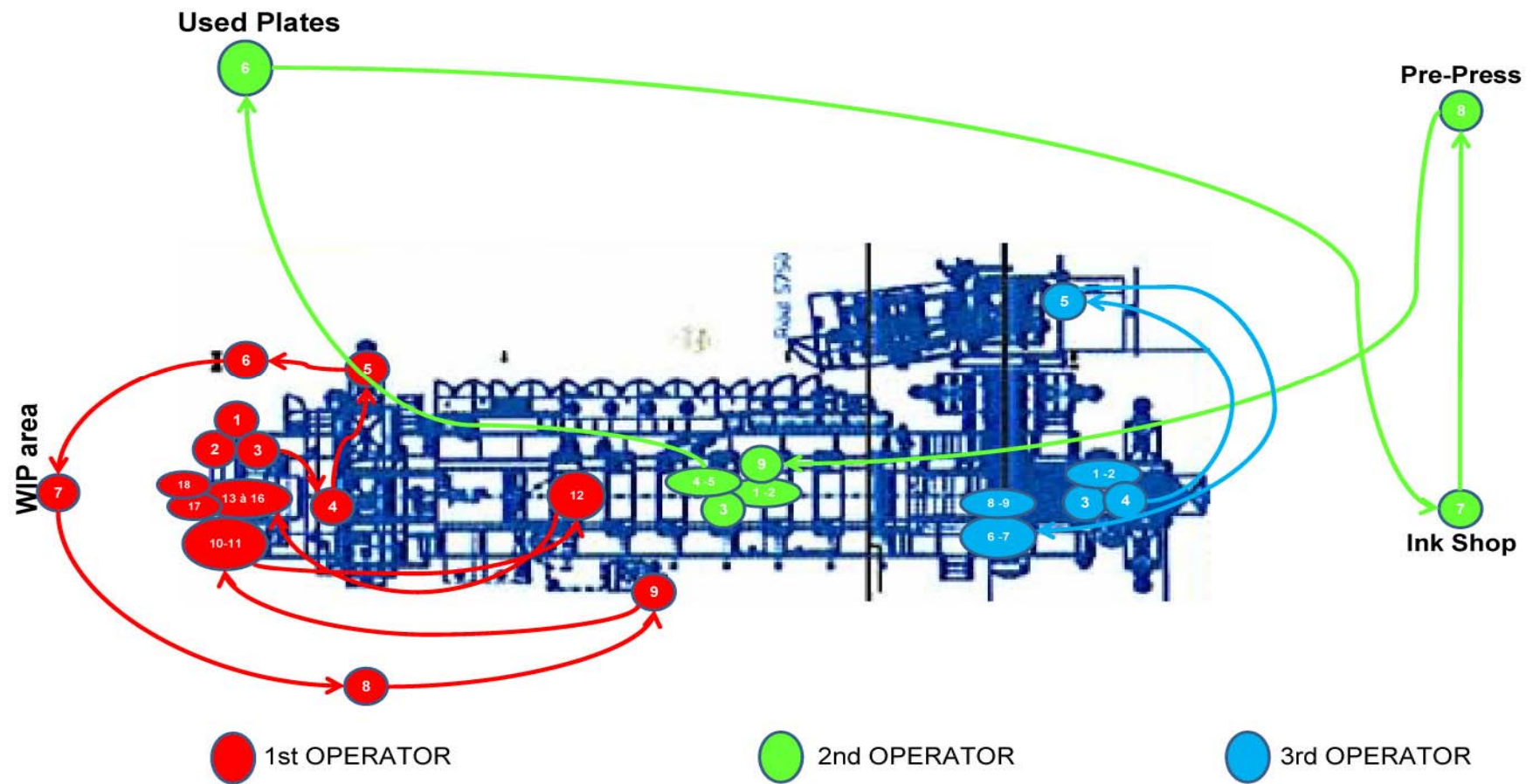
- The steps included here are:
- documentation steps (completion of the work dossier),
- preparation of the die plate, bending, checking, preparations for the replacement of the plate,
- uploading, checking CIP3 data,
- interpretation of the work dossier,
- preparation of the lacquer form,
- preparation, unwrapping of the print carrier,
- preparation of detergents, materials,
- preparation of printing colours, etc.

Research methods

- During the SMED project, merely joint team work contributed to the success, because the workers themselves planned work processes, and optimized their operations. Such difficulties were experienced as the differing competence levels.
- Certain printing engineers were capable of performing only certain steps, thereby deteriorating flexibility, but within the framework of the lean training program the differing competence levels could also be resolved.
- We tested the newly framed work processes in practice, with success. The same steps were taken by the printing engineers, but in a different order, and thus materially cut the time demand of setup .

Spaghetti map - optimized

MOTION DIAGRAM - OPTIMIZED

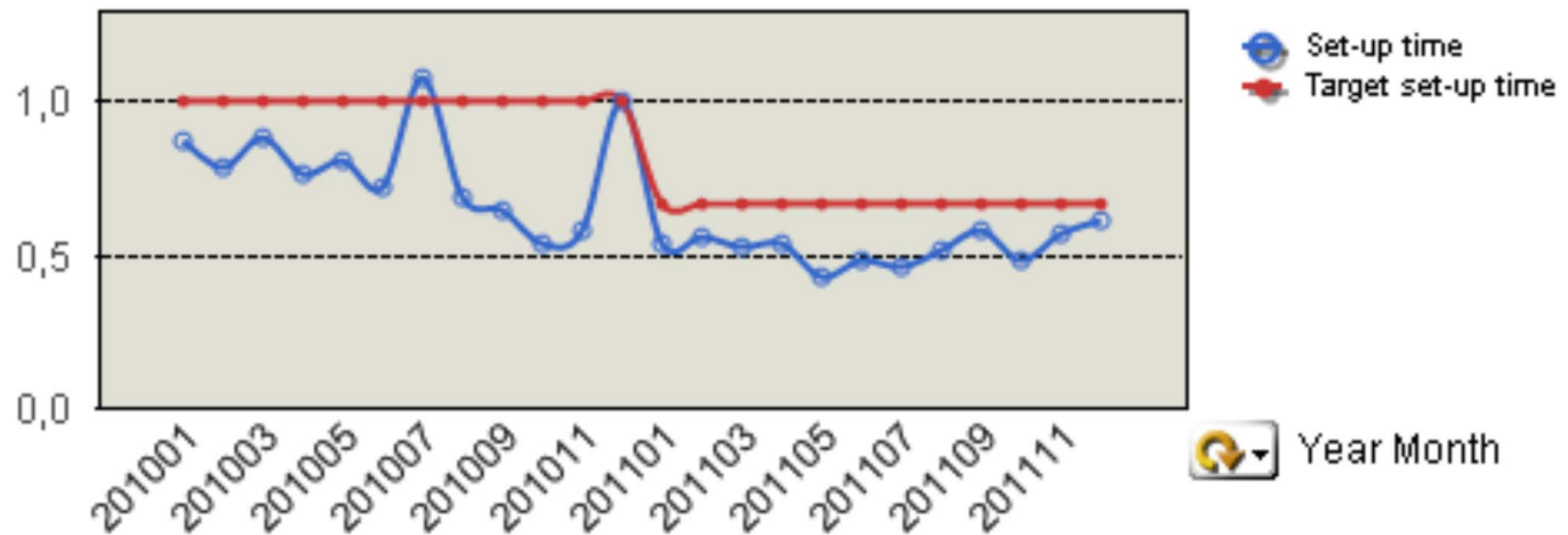


Summary of results

- In 2011, the optimization of the printing process proved to be the key achievement in the life of the plant. Our aim has been accomplished, as the setup times and the number of reject sheets have been substantially reduced and permanently minimized.
- This Figure also shows that the problems associated with the speed of the machine and time losses are still to be tackled. However, it is again an outcome corresponding to our step-by-step approach.
- For the upcoming year, we should make progress in this latter field, as well. Our successes so far underline the efficiency of the application of *lean management*, and as a consequence there is rising trust in our researches and the related, practical organizational work.

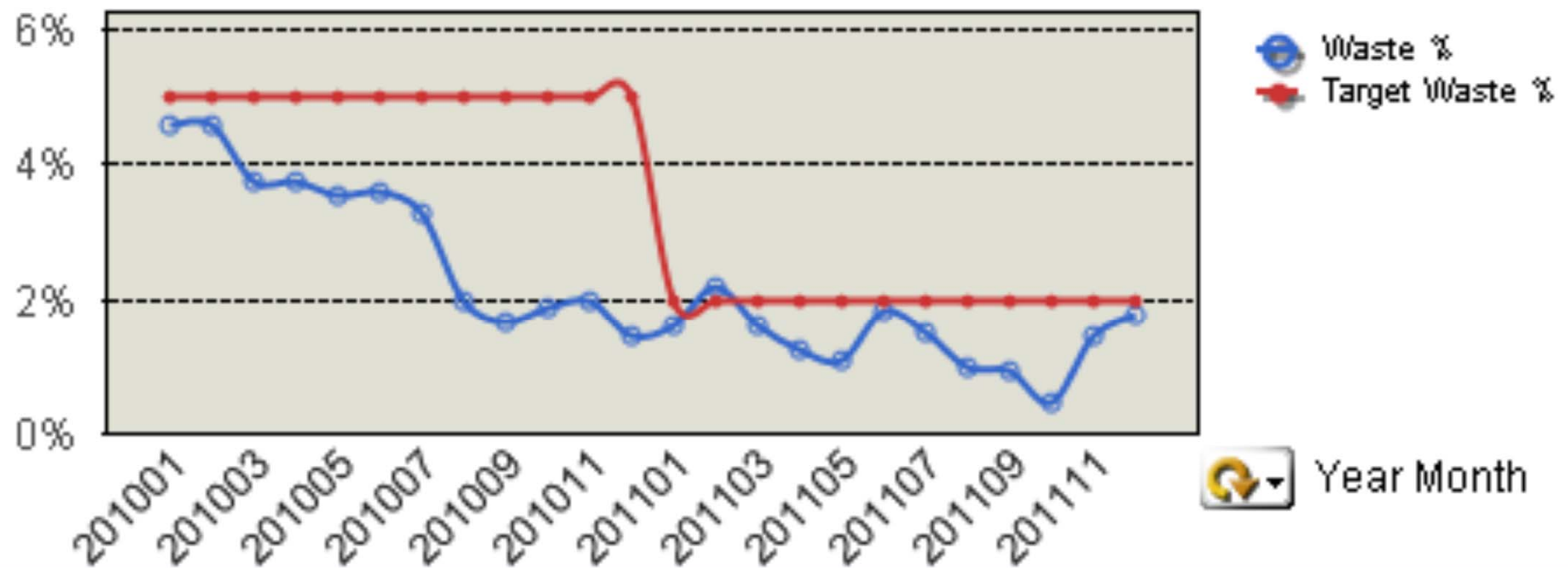
Summary of results

Set-up time

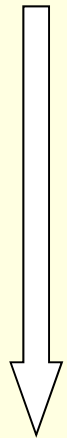


Summary of results

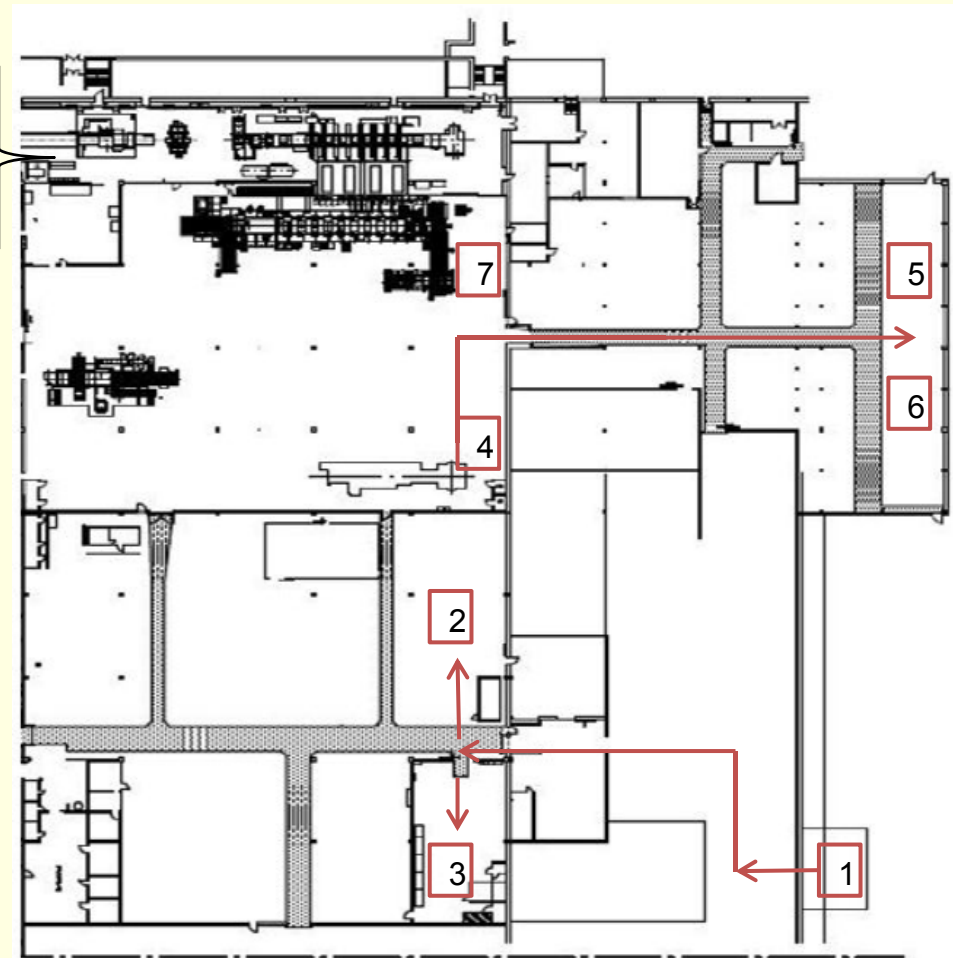
Waste %



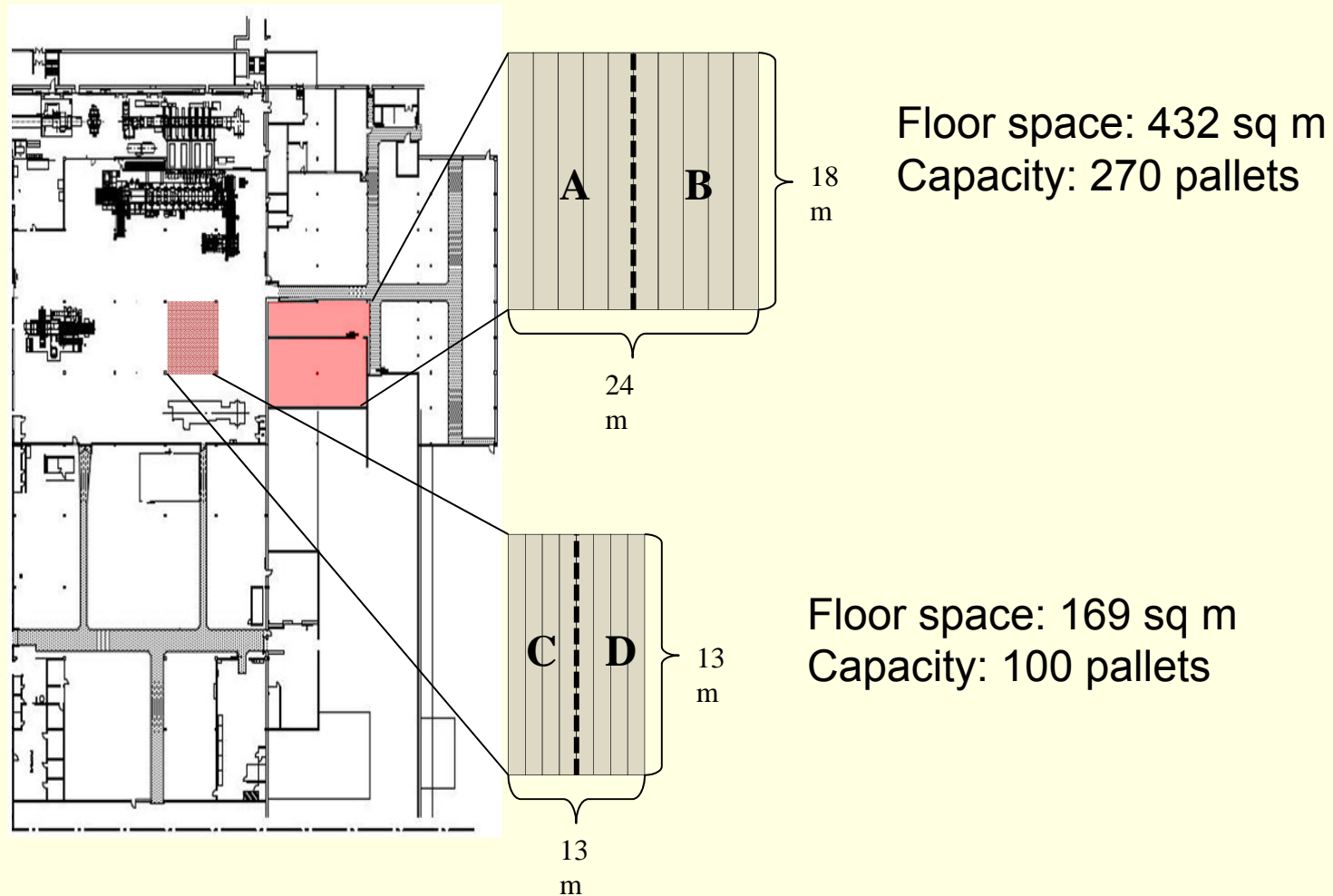
Unoptimized material flow



- 1. Incoming goods
- 2. Roll warehouse
- 3. Roll warehouse
- 4. Cutting machine
- 5. In-process inventories
- 6. In-process inventories
- 7. Printing press



Optimized material flow



5S

Surroundings of the KBA Rapida 142 sheet-fed offset press



5S

Surroundings in a printing workshop of sheet fed offset presses



Hungarian printing companies, who have been managing the lean printing

Company	Based	Ownership	Products profile	Beginning of lean
DS Smith Packaging Hungary Kft.	Győr	DS Smith Packaging (US)	cardboard box	2010
STI Petőfi Nyomda Kft.	Kecskemét	STI (G)	cardboard box	2013
Colorpack Zrt.*	Nyíregyháza	privat (H)	commercial printing	2011
Marzek Kner Packaging Kft.*	Békéscsaba	Marzek (A)	label cardboard box	2013
RR Donnelly Hungary Kft.	Debrecen	RR Donnelly (US)	manuals cardboard box	2014

Conclusion 1

- Today, profitable printing production is not feasible by means of price increases; the only expedient way to follow is to cut costs. In this respect, *lean management* can be supportive.
- To be faster, then the lion?

Conclusion 2

„A journey of a thousand miles begins
with a single step”

Lao Tzu

csaba.horvath@rkk.uni-obuda .hu

Thank you
for your kind attention !



Csaba Horváth