

A tool to assist and evaluate workstation design

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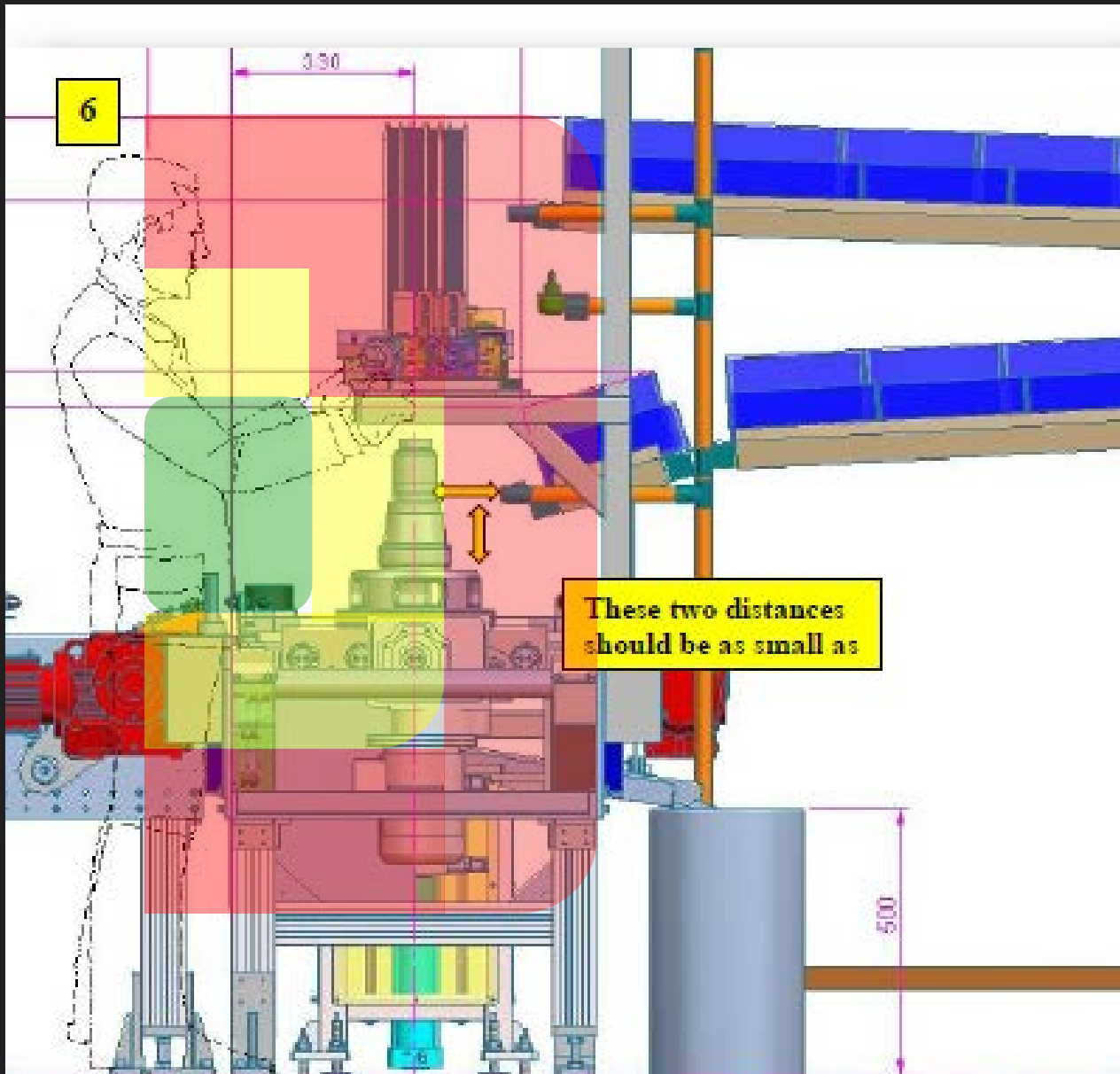
The problem today:

“WORKSTATIONS JUST HAPPEN”

Problems are built in



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Current practice



- Experience

- Lean
- Ergonomics
- Environmental

Audit example: Tool weight

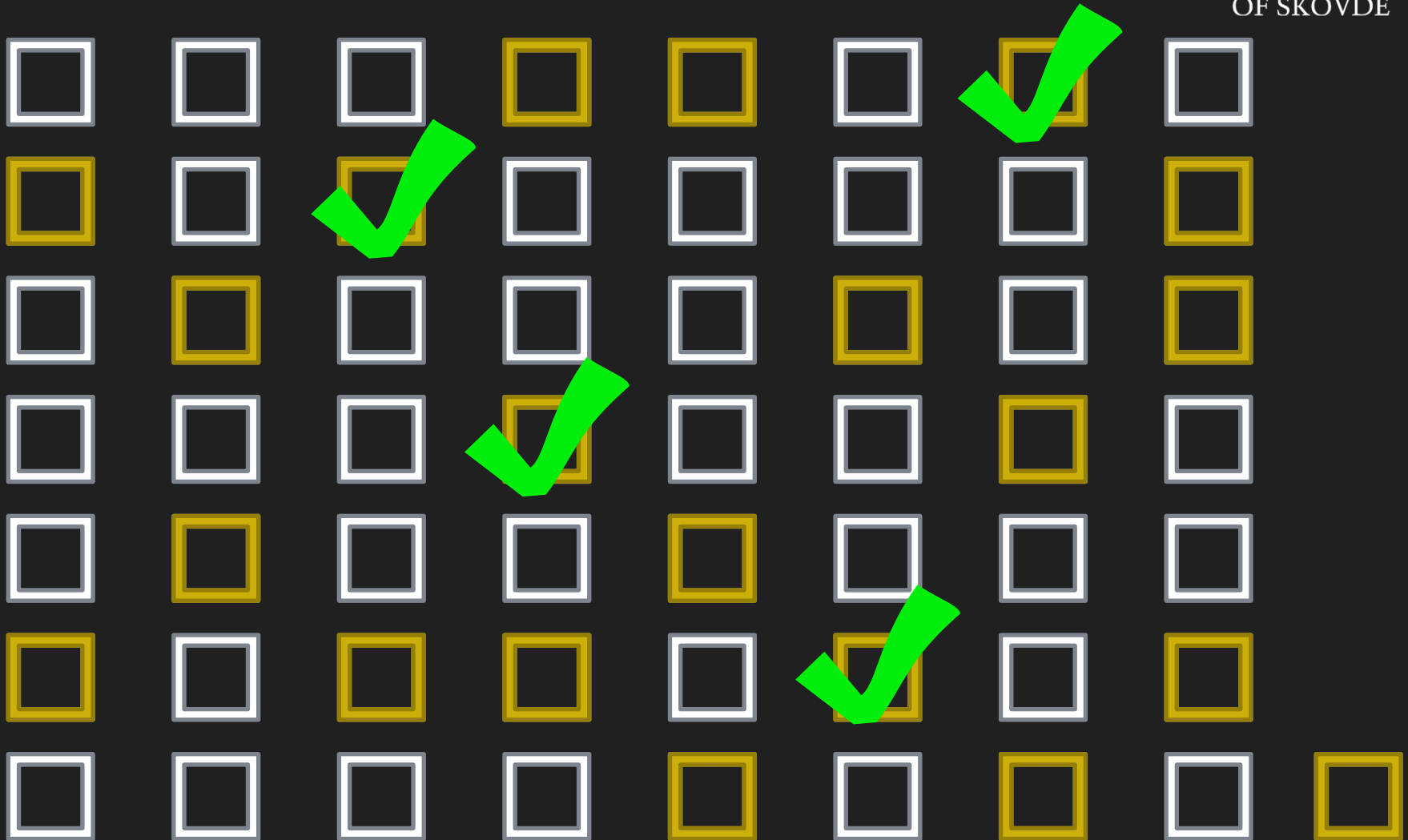
Level	Description
L5	N/A
L4	N/A
L3	All tools <3kg No use of hand operated assembly tools, e.g. screwdrivers torque drivers for regular operations
L2	Ergonomic assistance has been introduced for heavy or un-ergonomic tools. All tools <5 kg (with ergonomic assistance)
L1	Heavy hand tools and equipment causing ergonomic strain have been identified and there is a plan to replace them in the next 12 months.
L0	No consideration of tool weight / ergonomics in process design



Audit based on x Production System

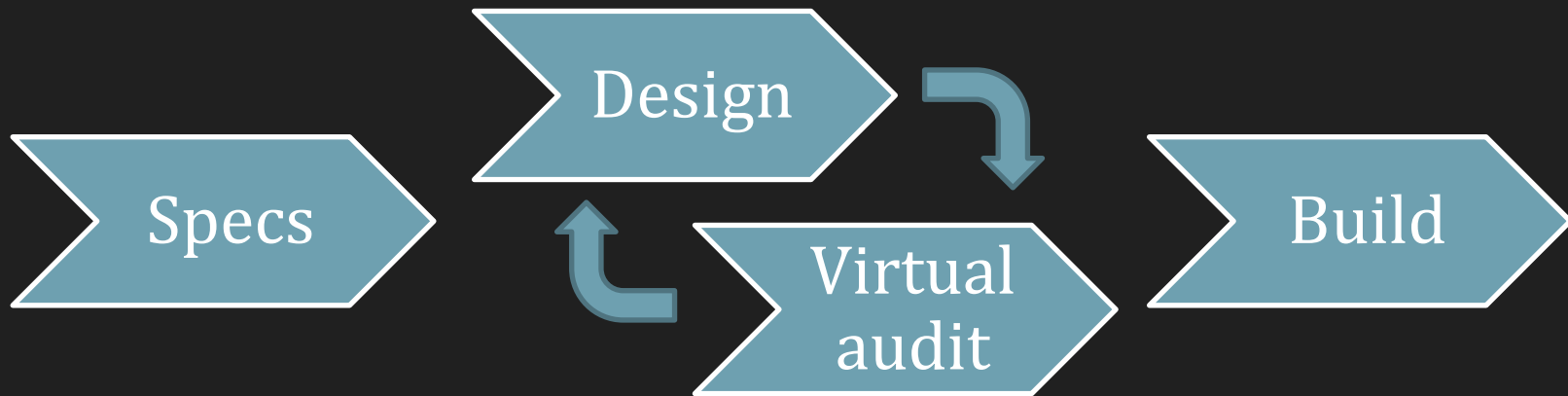


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Develop a tool to assist with Process & Methods





Purpose of the tool



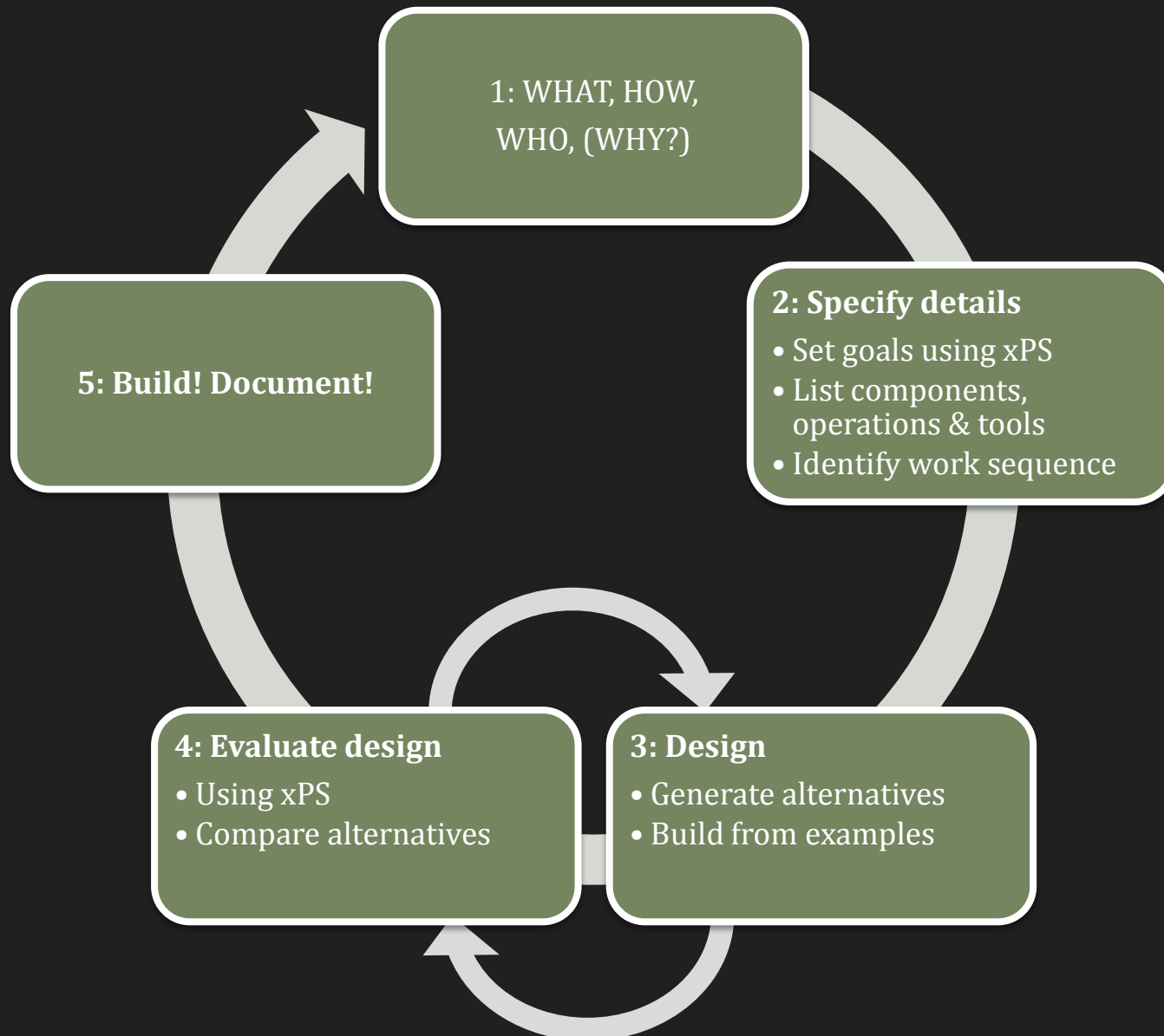
1. Assist in creating workstations
2. Educate users
3. “Institutionalize knowledge”



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RESULTS FROM WORK IN PROGRESS

The process



Mission statement

Step 1: What, Why, How, Who?

Background

What is done at this workstation?

Why should it be done? What is the problem? What is the purpose?

Why does this work need to be done?
Problem to solve, goals to meet?

Expected /desired outcomes

What will the effects be? What are you hoping to achieve?

Existing or alternative solutions?

What existing solutions are we aware of?
Where can we find one? Pros & Cons? Cost?

Stakeholders

[See STEP 1b](#)

Limitations

Budget constraints, only using existing technology within the company...?

Risks

SWOT matrix? Risk horizon 1-3 (Level of known product/process...)

What are the risks?

Stakeholders, users & needs



User type:	Role	Needs during Ramp-up	Needs during Normal use	
Primary user	Operator		Sven has problems gripping small items in bulk. Would like automatic feed.	B m c in
<i>Name, who to talk to:</i>	Sven, Fia	Eva (Ergonomist)	Eva (Ergonomist)	B
Secondary user	Maintenance			E c
<i>Name, who to talk to:</i>				
Side user	Next station	Does not interfere with workflow at next station		
<i>Name, who to talk to:</i>				
Co-user	Material supply			
<i>Name, who to talk to:</i>				

User needs at o
 Fill in each user
 for each relevan
 use for the work
 Eg. Primary user
 normal operatio

Step 2: Identify tools and equipment

This step helps you define the details. What articles, what operations, what tools,
This helps you know e.g. how much space is needed.

At this workstation:

Art.no	Component	Packaging	Operation	Tool	Media	Accessory 1	Accessory 2
1	Nail X	Cardboard box	Insert	(Manually)	(Manual)		
2	Screw M8	Plastic box 700	Screwing	Pneumatic driver	Pneumatic	Spring balancer	
3	Turbo	Pallet	Insert	(Manually)	(Manual)		
4	Bolt M12	Plastic box 900	Cutting	Scissors	Electric	Spring balancer	
5	Snap-on	Cardboard box	Insert	(Manually)	(Manual)		
6	Metal plate	Plastic box 1100	Cutting	Scissors	Pneumatic		
7	Bolt	Plastic box 900	Hammering	Hammer	Manual		
8				Hammer			
9				Sledge			
10				Nailgun			
11							

Station Design

Purpose: To establish a workplace that enables manufacture of products with high quality at the lowest possible cost and the highest regard for worker safety and wellbeing

Station layout flexibility

Reasons: Allows station to be improved quickly and with low cost. Foundation to flexibility, e.g. when changing takt time.

Target system All equipment can be moved quickly to support flexibility. For example, to support quick/simple re-balancing for takt time changes, adding or removing stations.

How to evaluate Shop floor observation. Assembly processes only.

(method) No. Of racks, equipment, tooling that can be moved easily (e.g. not bolted to floor) / total number of racks, equipment, tooling etc.

What to evaluate Are racks, equipment, tools, lifting equipment, robots, etc easy/quick to move to support flexibility? Can design **(evidence)** (size and shape) of racking by changed?

Estimated current level	L1
Desired level	L3
Level	<div style="border: 1px solid black; padding: 2px;"> L5 L4 L3 L2 L1 </div>
L5	Movement of all racks, all equipment, lifting equipment, etc can be done within minutes or hours with low cost.
L4	
L3	Movement of most racks, tools & simple equipment, lifting equipment, etc can be done within hours with low cost.
L2	Movement of most racks, tools and simple equipment, can be done by the shop floor team within hours with low cost, e.g. racks on wheels.
L1	Racking, equipment can be moved in a couple of days, e.g. racks are bolted to floor
L0	Mainly fixed racks, equipment, etc. Costly and / or takes weeks to move.

List of requirements

Requirements

This page is read-only: These requirements are *automatically generated* when you select your desired levels from the XPS Assessment.

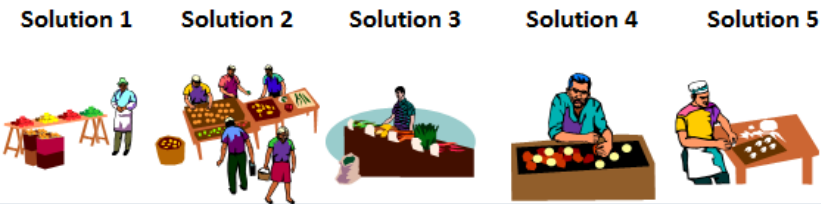
<i>Category</i>	<i>Desired level:</i>	<i>Description:</i>
Safety and Health		
Safety & Health risks	L4	The team highlights unsafe acts and unsafe conditions on a daily basis and action is taken to reduce risks.
Noise level within the area	L3	<80 dB(A) <XX dB(P)
Quality		
Andon	L3	Andon is used to drive improvements in direct runner metric and improvements can be shown in the data
Synchronisation		
Process Design 1	L5	Fishbone layout with sub-assembly areas next to the main line >100% of sub-assemblies/kits from prep areas

Compare & evaluate solutions

Requirements

Evaluation of alternative layouts

The best solution for each criteria is marked in green. What makes it so good?
Can this be implemented in another layout to get the best overall solution?



Category Target level: Description:

Safety and Health

Category	Target level	Description	Solution 1	Solution 2	Solution 3	Solution 4	Solution 5
Safety & Health risks	L5	The team highlights unsafe acts and unsafe conditions in real time and action is taken immediately to reduce risks.	2	1	3	2	1
Noise level within the area	L3	<80 dB(A) <XX dB(P)	3	1	2	1	2

Quality

Andon	L3	Andon is used to drive improvements in direct runner metric and improvements can be shown in the data	1	2	1	2	3
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Synchronisation

Process Design 1	L4	Fishbone layout with sub-assembly areas next to the main line >75% of sub-assemblies/kits from prep areas	1	1	2	3	2
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Evaluation scale
1: This solution does not meet the criteria very well.
2: This is an acceptable solution to this criteria
3: This is an excellent solution to this criteria.



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FUTURE IDEAS

Future ideas



Database of examples

More "Green"

Web-based?

Contact



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Gröna Leanresan

Denna presentation är ett delresultat inom Vinnova-projektet Lean & Green Production Navigator
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Mer att läsa finns på

www.ngps.se

För referens ange:

Bergman, C. (2014). *A tool to assist and evaluate workstation design*. Presentation VINNOVAs Dr 2011-01107.

