CLIMBING
THE MOUNTAIN

COURSEWARE

YELLOW BELT
COURSEWARE

LSSA LEAN (SIX SIGMA)

MINDSET, SKILL SET & TOOL SET

H.C. THEISENS, T. HESP, D. HARBORNE

LSSA Lean Yellow Belt

LSSA Lean Six Sigma Yellow Belt

Van Haren PUBLISHING

LSSA Lean (Six Sigma) – Yellow Belt Courseware

Colophon

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Publisher about the Courseware

The Courseware was created by experts from the industry who served as the author(s) for this publication. The input for the material is based on existing publications and the experience and expertise of the author(s). The material has been revised by trainers who also have experience working with the material. Close attention was also paid to the key learning points to ensure what needs to be mastered.

The objective of the courseware is to provide maximum support to the trainer and to the student, during his or her training. The material has a modular structure and according to the author(s) has the highest success rate should the student opt for examination. The Courseware is also accredited for this reason, wherever applicable.

In order to satisfy the requirements for accreditation the material must meet certain quality standards. The structure, the use of certain terms, diagrams and references are all part of this accreditation. Additionally, the material must be made available to each student in order to obtain full accreditation. To optimally support the trainer and the participant of the training assignments, practice exams and results are provided with the material.

Direct reference to advised literature is also regularly covered in the sheets so that students can find additional information concerning a particular topic. The decision to leave out notes pages from the Courseware was to encourage students to take notes throughout the material.

Although the courseware is complete, the possibility that the trainer deviates from the structure of the sheets or chooses to not refer to all the sheets or commands does exist. The student always has the possibility to cover these topics and go through them on their own time. It is recommended to follow the structure of the courseware and publications for maximum exam preparation.

The courseware and the recommended literature are the perfect combination to learn and understand the theory.

-- Van Haren Publishing

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Van Haren Publishing (VHP) specializes in titles on Best Practices, methods and standards within four domains:

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Topics are (per domain):

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Novius Architectuur Methode
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BiSL® and BiSL® Next
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EFQM
eSCM
IACCM
ISA-95
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OPBOK
SixSigma
SOX
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A4-Projectmanagement
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M_o_R®
MSP®
P3O®
PMBOK® Guide
Praxis®
PRINCE2®

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CONTENT

Timetabel

Day 1		Lean YB	Lean Six Sigma YB
-	Introduction	✓	✓
U1	World Class	✓	✓
U2	Policy Development	✓	✓
U3	Managing a project	✓	✓
U4	CIMM level I - Create a solid foundation	✓	✓
-	5S number Game	✓	✓
U5	CIMM level II - Creating a continuous improvement culture	✓	✓
-	Lean simulation: Popcorn - Soda - Ice (Round 1)	✓	✓
Day 2			
U6	CIMM level III - Creating stable and efficient processes	✓	✓
-	Lean simulation: Popcorn - Soda - Ice (Standup + Round 2)	✓	✓
-	Lean simulation: Popcorn - Soda - Ice (Standup + Round 3)	✓	✓
U7	CIMM level IV - Creating capable processes		✓
-	Sample exam		✓
-	Evaluation		✓

PART I

LEAN & SIX SIGMA YELLOW BELT

BODY OF KNOWLEDGE

INTRODUCTION

Within the domain of Lean and Six Sigma individuals can be trained and certified at different levels. The levels are listed in the Table below.

Belt level	Level
Lean Yellow Belt	Awareness
Lean Six Sigma Yellow Belt	Awareness
Lean Six Sigma Orange Belt	Foundation
Lean Green Belt	Practitioner
Lean Six Sigma Green Belt	Practitioner
Lean Black Belt	Expert
Lean Six Sigma Black Belt	Expert
Master Black Belt	Master

Table 1 - Overview of Lean Six Sigma Belt levels

The LSSA - Lean Six Sigma Academy® was established in September 2009 with the objective to develop an international recognized certification scheme for all Lean and Six Sigma Belt levels. For each level the LSSA Exam Board has developed Skill sets with clear criteria for skills and competences. These Skill sets specify which of the overall Lean and Six Sigma techniques are expected to be included within certain Belt level competencies.

The LSSA Yellow Belt Skill sets describe the assessment criteria for the theoretical exam. The Yellow Belt certification can be achieved independently. There are no pre-requisites for certification and therefore does not require any prior completion of any other Belt. After completion of the Lean Six Sigma Yellow Belt you can subscribe for the Lean Six Sigma Orange or Green Belt scheme.

Lean Six Sigma training is provided by a global network of 'Accredited Training Organizations' (ATOs). These ATOs provide training programs that are aligned to the LSSA Skill sets. Examination is provided through the LSSA directly or through APM Group Limited. The exams are open to all. Individuals can apply directly or sign up via one of the ATOs. It is recommended that candidates receive training through an ATO to prepare for certification. Check the LSSA website for an overview of ATOs and the actual exam requirements. On the website you will also find information about how you can claim your Digital badge. Then share your Digital badge on LinkedIn and show that you are active as a Yellow Belt.

Figure 1 – Digital badge

THEORETICAL ASSESSMENT CRITERIA

The assessment criteria for the theoretical Lean Yellow exam are as follows:

- The theoretical exam consists of 40 multiple choice questions.
- The duration of the exam is 60 minutes.
- The pass mark for the exams is set at 63% (25 marks or more required to pass).
- The exam is Open book, where a maximum of 2 books are allowed.
- A calculator is allowed.
- You must be able to identify yourself with photographic ID.
- There is no practical exam (only for Green and Black Belt certification).

The assessment criteria for the theoretical Lean Six Sigma Yellow exam are as follows:

- The theoretical exam consists of 50 multiple choice questions.
- The duration of the exam is 60 minutes.
- The pass mark for the exams is set at 63% (32 marks or more required to pass).
- The exam is Open book, where a maximum of 2 books are allowed.
- A calculator is allowed.
- You must be able to identify yourself with photographic ID.
- There is no practical exam (only for Green and Black Belt certification).

CONTINUOUS IMPROVEMENT MATURITY MODEL (CIMM)

CIMM summarizes best practices and techniques of different methodologies in one framework, for different stages of maturity. The CIMM framework describes five consecutive stages: Creating a solid foundation, Creating a continuous improvement culture, Creating stable and predictable processes, Creating capable processes and Creating future-proof processes. Within Lean only the first three levels apply. For Six Sigma all five levels apply.

For each instrumental technique in the CIMM framework, it is possible to indicate the associated desired behavior. The CIMM framework identifies a number of behaviors for each improvement technique, which helps determine whether or not the implementation of the technology in question will be a success and results in a lasting impact.

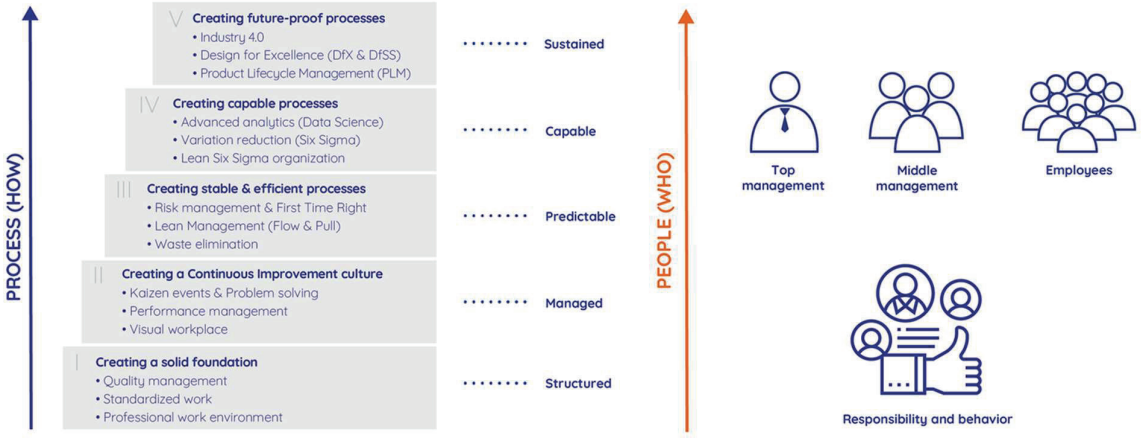

Figure 2 – CIMM Process (HOW) and People (WHO)

The following chapters describe the theoretical skill set elements. The structure consists of a number of 'Units', 'Elements' and 'Performance Criteria'.

- **Unit:** The skill set areas are called 'Unit'. The chapters in the book 'Climbing the Mountain' reflect the 'Units' described in this skill set.
- **Element:** Each 'Unit' consists of a number of 'Elements'. The sections]in each chapter of the book 'Climbing the Mountain' reflect the 'Elements' in this skill set.
- **Performance Criteria:** Each 'Element' consists of a number of 'Performance Criteria' and each 'Performance Criteria' has an explanation. These describe the tools, techniques and competencies that are required to be achieved by the Belt. A 'Cognitive Level' has been assigned to each 'Performance Criteria' according to Bloom's Taxonomy [Appendix A].

U1. WORLD CLASS PERFORMANCE

The Unit 'World Class Performance' reviews the general philosophy of continuous improvement. It discusses the overview of different process improvement methods and the history of the most important methodologies. It also explains why continuous improvement is important.

E1. CONTINUOUS IMPROVEMENT

The Learning Element 'Continuous Improvement' reviews the history, values and principles of the most common process improvement methodologies. Also, the culture within a continuous improvement organization as well as roles and responsibilities are reviewed.

U1.E1.PC1 **Continuous Improvement history** **Remember**
Recall the origins of quality management, Kaizen and Lean.

U1.E1.PC2 **Continuous Improvement values and principles** **Understand**
Understand that Lean philosophy and principles realize improvements in process lead times and efficiencies. Recall the difference between Top-Down and Bottom-Up approach.

U1.E1.PC3 **Continuous Improvement Maturity Model** **Understand**
Understand the different maturity levels of process management as described in the Continuous Improvement Maturity Model.

U1.E1.PC4 **Continuous Improvement roles and responsibilities** **Remember**
Recall the various continuous improvement roles and responsibilities.

E2. CUSTOMER VALUE (VOC & CTQ)

The Learning Element 'Customer value' reviews customer identification (internal/external), customer requirements and the CTQ-measure.

U1.E2.PC1 **Voice of the Customer (VOC)** **Understand**
Understand the Voice of the Customer (VOC). Understand that different customers have different needs, expectations, requirements and desires.

U1.E2.PC2 **Critical to Quality (CTQ)** **Understand**
Understand that Voice of the customer requirements need to be translated into CTQ targets and specifications.

U2. POLICY DEVELOPMENT AND DEPLOYMENT

The Unit 'Policy development and deployment' reviews how policy development and deployment help organizations in defining a continuous improvement strategy and to run efficiently in achieving their objectives.

E1. POLICY DEVELOPMENT

The Learning Element 'Policy development' explains the importance of a so-called True North and how to develop an operational excellence strategy.

U2.E1.PC1 **Vision & True North** **Understand**
Understand the meaning and importance of the organization's True North. Understand the meaning of Operational Excellence.

E2. POLICY DEPLOYMENT

The Learning Element 'Policy deployment' is focusing on the execution process of the improvement strategy. Within this element financial and performance metrics will be reviewed.

U2.E2.PC1 **Management of change** **Remember**
Recall that an organization's culture can influence the success of Lean Six Sigma deployment.

U3. PROJECT MANAGEMENT

The Unit 'Project Management' outlines the way improvement projects should be executed. A number of process improvement roadmaps is reviewed. The Unit also reviews project selection.

E1. MANAGING A PROJECT

The Learning Element 'Managing a project' reviews how to set up, plan and execute a project.

U3.E1.PC1 **Project selection** **Understand**
Understand the process of project selection.

U3.E1.PC2 **Project charter** **Understand**
Describe a proper problem statement in relation to customer requirements or complaints.

E2. PROCESS IMPROVEMENT ROADMAPS

The Learning Element 'Process Improvement Roadmaps' reviews a number of roadmaps, including PDCA and DMAIC.

U3.E2.PC1 **Kaizen roadmap (PDCA)** **Understand**
Understand project management methods that are used at the shop floor for Kaizen initiatives (e.g. PDCA, A3-report).

U3.E2.PC2 **Lean Six Sigma Roadmap (DMAIC)** **Understand**
Understand and follow the DMAIC roadmap.

U4. CIMM LEVEL I – CREATING A SOLID FOUNDATION

The Unit 'Creating a solid foundation' reviews how to achieve a solid foundation for further process improvement programs. This foundation consists of a proper and organized work environment and standardized work.

E1. PROFESSIONAL WORK ENVIRONMENT

The Learning Element 'Professional work environment' is about good housekeeping and how to set up a proper and safe work environment in a structured manner.

U4.E1.PC1 **Organized work environment (5S)** **Understand**
Understand how organizing the work environment, by applying 5S (Sort, Straighten, Shine, Standardize, Sustain), will improve safety and moral.

E2. STANDARDIZED WORK

The Learning Element 'Standardized work' is about implementing and improving standards and protocols.

U4.E2.PC1 **Standard Operating Procedure** **Understand**
Understand that standardized tasks are the foundation for continuous improvement. Interpret standard operating procedures (SOPs) and one-point-lessons.

E3. QUALITY MANAGEMENT

The Learning Element 'Quality Management' is about developing procedures to identify and detect defects. Also preventing mistakes and avoiding problems are part of this element.

U4.E3.PC1 **Quality Management System** **Understand**
Understand quality procedures, the need to be disciplined and to work according procedures.

U5. CIMM LEVEL II – CREATING A CONTINUOUS IMPROVEMENT CULTURE

The Unit 'Creating a continuous improvement culture' reviews how to create a continuous improvement culture at the shop floor. This Unit reviews setting up Kaizen teams. It also reviews a number of problem-solving techniques and tools.

E1. VISUAL MANAGEMENT

The Learning Element 'Visual management' reviews how to set up a workplace that is organized and self-explaining.

U5.E1.PC1 **Visual workplace** **Apply**
Apply elements of Visual Workplace and understand how these can help to control the improved process.

E2. PERFORMANCE MANAGEMENT

The Learning Element 'Performance management' reviews how to set targets, and how to organize the work to be done. The Learning Element also reviews how to facilitate improvement teams at the shopfloor that work on Kaizen improvement initiatives and Problem Solving.

U5.E2.PC1 **Daily stand-up meetings** **Understand**
Participate in stand-up meetings and Scrum sessions.

U5.E2.PC2 **Kaizen events and problem solving** **Apply**
Describe and understand the importance of the Kaizen principles. Participate in Kaizen events and continuous improvement initiatives. Apply root cause analysis and understand the issues involved in identifying a root cause.

E3. BASIC QUALITY TOOLS

The Learning Element 'Basic quality tools' reviews techniques to visualize data and guidelines how to facilitate and participate in brainstorm sessions.

U5.E3.PC1 **Brainstorm techniques** **Understand**
Understand brainstorm techniques: Affinity diagram, 5-Whys and Ishikawa. Participate in brainstorm sessions.

U5.E3.PC3 **Visualization of data** **Understand**
Understand basic quality tools to visualize data: Scatter plot, Pareto chart, Bar chart, Pie chart, Time series plot and Histogram.

U6. CIMM LEVEL III – CREATING STABLE AND EFFICIENT PROCESSES

The Unit 'Creating stable and efficient processes' reviews how the logistical flow of processes can be improved and made more stable, predictable and efficient. This Unit reviews tools which can be used to visualize and analyze the process flow as well as a number of tools and techniques that can be used to improve efficiency, effectiveness, productivity and agility of processes. All Level III Learning Elements and Performance Criteria follow the DMAIC structure.

DEFINE

E1. PROCESS MAPPING

The Learning Element 'Process Mapping' reviews a number of tools to map and analyze the flow of a process.

U6.E1.PC1 **High-level process description and SIPOC** **Understand**
Understand the Spaghetti diagram and SIPOC.

U6.E1.PC2 **Process Flow diagram** **Understand**
Understand the importance of process mapping to visualize the flow of activities and decisions within a process.

MEASURE

E2. PERFORMANCE METRICS

The Learning Element 'Performance metrics' reviews performance metrics for both logistics as for quality.

U6.E2.PC1 **Performance metrics (Time)** **Remember**
Recall performance metrics related to time (e.g. takt time, cycle time and lead time).

U6.E2.PC2 **Performance metrics (Quality)** **Remember**
Recall performance metrics related to quality (e.g. Yield and RTY).

E3. BASIC STATISTICS

The Learning Element 'Basic statistics' reviews different types of data, measurement scales and data collection tools. Also a set of measures (statistics) that characterizes a given set of data are reviewed.

U6.E3.PC1 **Data types and Measurement scales** **Remember**
Recall the different types of data and that there is a difference between counting and measuring.

U6.E3.PC2 **Data collection tools** **Understand**
Understand tools for collecting data such as data sheets and check sheets.

ANALYZE

E4. VALUE STREAM ANALYSIS

The Learning Element 'Value Stream Analysis' reviews how to create a Value Stream Map of the current situation.

U6.E4.PC1 **Value adding versus Non-value adding** **Understand**
Understand the difference between value adding and non-value adding activities.

IMPROVE

E5. REDUCING MUDA (WASTE)

The Learning Element 'Reducing Muda' reviews how to identify and eliminate Waste in the organization and its processes.

U6.E5.PC1 **Waste identification and elimination** **Apply**
Identify and eliminate process Waste (Muda): Overproduction, Waiting, Transport, Overprocessing, Inventory, Movement, Defects and Unused expertise.

E6. REDUCING MURI (OVERBURDEN)

The Learning Element 'Reducing Muri' reviews how to identify overburden in the organization. This element also reviews how to implement flow and work balancing to reduce overburden.

U6.E6.PC1 **Flow** **Understand**
Understand the meaning of Flow.

E7. REDUCING MURA (UNEVENNESS)

The Learning Element 'Reducing Mura' reviews how to identify unevenness in the organization and its processes. This element also reviews a number of techniques to reduce unevenness.

U6.E7.PC1 **Pull** **Understand**
Understand the meaning of Pull.

CONTROL

E8. PROCESS AND QUALITY CONTROL

The Learning Element 'Process and Quality control' looks at how results that have been achieved in process improvement projects can be sustained. This element reviews the following techniques and principles: First Time Right, Jidoka and Poka Yoke.

U6.E8.PC1 **First Time Right (FTR)** **Understand**
Understand the importance of First Time Right principles. Understand the work has to be stopped when there is a quality problem (Jidoka). Identify opportunities to apply Poka Yoke to avoid quality problems.

U7. CIMM LEVEL IV – CREATING CAPABLE PROCESSES

The Unit 'Creating Capable Processes' focuses on reducing variation in a stable process with the objective to create a process capable of meeting customer requirements. This Unit reviews the application of Six Sigma and statistical tools used to assure a valid and reliable performance measurement system, to collect data and to analyze the performance of processes. Six Sigma focuses on quality breakthrough improvement projects. All Level IV Learning Elements and Performance Criteria follow the DMAIC structure.

MEASURE

E1. STATISTICAL TECHNIQUES

The Learning Element 'Statistical techniques' reviews a number of metrics that are often used in Six Sigma projects. The element also reviews a number of sampling methods for assuring data accuracy and integrity.

U7.E1.PC1 **Variation** **Understand**
Understand the difference between special cause and common cause variation.

U7.E1.PC2 **Sampling** **Understand**
Understand it is important to follow systematic data collection. Understand the basic terms of statistics e.g. mean and spread.

E2. DISTRIBUTIONS

The Learning Element 'Distributions' reviews a number of continuous and discrete distributions. The element also reviews the central limit theorem and a number of probability concepts.

U7.E2.PC1 **Continuous distributions** **Remember**
Recall that many processes are normally distributed.

E3. MEASUREMENT SYSTEMS

The Learning Element 'Measurement Systems' reviews how to evaluate measurement systems.

U7.E3.PC1 **Measurement systems analysis** **Understand**
Understand the importance of reliable measurement systems.

ANALYZE

E4. HYPOTHESIS TESTING & CONFIDENCE INTERVALS

The Learning Element 'Hypothesis Testing & Confidence Intervals' reviews test methods that are used to test a hypothesis. This Learning Element also discusses Confidence Intervals that indicate the reliability of test conclusions.

U7.E4.PC1 **Hypothesis testing** **Remember**
Recall the basic principles of hypothesis testing.

E5. TESTS FOR MEANS, VARIANCES AND PROPORTIONS

The Learning Element 'Tests for means, variances and proportions' reviews the basic principles of hypothesis testing.

U7.E5.PC1 **Tests for means** **Remember**
Recall the basic principles of tests of means.

E6. CORRELATION AND REGRESSION

The Learning Element 'Correlation and Regression' describes the predictive models using regression techniques to determine the relation between factors on a response.

U7.E6.PC1 **Correlation coefficient** **Remember**
Recall the basic principles of correlation.

U7.E6.PC2 **Regression analysis** **Remember**
Recall the basic principles of linear regression.

APPENDIX A – BLOOM'S TAXONOMY FOR PERFORMANCE CRITERIA

In addition to specifying content, each performance criteria in this skill set also indicates the intended complexity level of the test questions for each topic. These levels are based on 'Levels of Cognition' (from Bloom's Taxonomy – Revised, 2001), and can be used to create learning outcomes for students.

The Taxonomy of Educational Objectives, often called Bloom's Taxonomy, is a classification of the different objectives that educators set for students (learning objectives). The taxonomy was proposed in 1956 by Benjamin Bloom, an educational psychologist at the University of Chicago. During the nineties, Lorin Anderson a former student of Bloom revisited the cognitive domain in the learning taxonomy. Bloom's Taxonomy divides educational objectives into three 'domains': Affective, Psychomotor and Cognitive. This Skill set only notices the Cognitive domain. The 'Levels of Cognition' are in rank order - from least complex to most complex. The Yellow Belt skill set mainly focuses on the levels 'Remember' and 'Understand'.

Remember
Recall or recognize terms, definitions, facts, ideas, materials, patterns, sequences, methods, principles, etc. The LSSA uses the following verb at this level: Recall.

Understand
Read and understand descriptions, communications, reports, tables, diagrams, directions, regulations, etc. The LSSA uses the following verbs at this level: Describe, Follow, Identify, Interpret, Participate, Understand.

Apply
Know when and how to use ideas, procedures, methods, formulas, principles, theories, etc. The LSSA uses the following verbs at this level: Apply, Assess, Assure, Calculate, Convert, Define, Demonstrate, Divide, Eliminate, Empower, Facilitate, Implement, Motivate, Organize, Plan, Prepare, Present, Promote, Propagate, Review, Select, Standardize, Support, Use.

Analyze
Break down information into its constituent parts and recognize their relationship to one another and how they are organized; identify sublevel factors or salient data from a complex scenario. The LSSA uses the following verbs at this level: Analyze, Construct, Deploy, Design, Develop, Distinguish, Evaluate, Lead, Manage, Translate.

Evaluate
Make judgments about the value of proposed ideas, solutions, etc., by comparing the proposal to specific criteria or standards. The LSSA does not uses this level in their skill sets.

Create
Put parts or elements together in such a way as to reveal a pattern or structure not clearly there before; identify which data or information from a complex set is appropriate to examine further or from which supported conclusions can be drawn. The LSSA does not uses this level in their skill sets.

PART II

LEAN & SIX SIGMA YELLOW BELT

SLIDEDECK

LEAN SIX SIGMA YELLOW BELT

VHR SLIDEDECK V3.3

lean six sigma academy

INTRODUCTION

Courseware slidedeck (v3.3)

- Based on LSSA Body of Knowledge (version 3.2)
- Lean Six Sigma Academy©
- ©Van Haren Publishing 2023
- info@lssa.eu

 2

LSSA EXAMS (THEORETICAL + PRACTICAL)

Theory exam	LYB	LSS YB	LSS OB	Lean GB	LSS GB	LSS BB
Nr of questions	40	50	50	40	60	60
Language	ENG/NED	NED/ENG	NED/ENG	NED/ENG	NED/ENG	NED/ENG
Pass mark	25	32	32	25	38	38
Pass mark	63%	63%	63%	63%	63%	63%
Duration	60min	60 min	120 min	120 min	180 min	180 min
Books	Open book	Open book	Open book	Open book	Open book	Open book
Tools	-	-	Calculator	Calculator	Minitab	Minitab
Practical assessment	LYB	LSS YB	LSS OB	Lean GB	LSS GB	LSS BB
		-	-	1 project	1 project	1 x level III +
				level III (or higher)	level III (or higher)	1 x level IV (or higher)

 3

INTRODUCTION

Reference materials

- Textbooks: 'Climbing the Mountain | Mindset, Skill set and Toolset'
- Exercise books: 'Climbing the Mountain | Exercise book'
- Courseware: 'van Haren | Courseware book'
- Optional: eLearning portal

Author: Theisens, H.C.; LSSA 2021

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INTRODUCTION

Body of Knowledge

- Publisher: LSSA B.V.
- Version 3.2
- March 2021

Remember	Understand	Apply	Analyze	Evaluate	Create
Recall	Describe	Apply	Analyze	-	-
	Follow	Assure	Construct		
	Identify	Assess	Deploy		
	Interpret	Calculate	Design		
	Participate	Convert	Develop		
	Understand	Define	Distinguish		
		Demonstrate	Evaluate		
		Differentiate	Lead		
		Divide	Manage		
		Eliminate	Translate		
		Empower			
		Encourage			
		Facilitate			
		Implement			
		Motivate			
		Organize			
		Plan			
		Prepare			
		Present			
		Promote			
		Propagate			
		Review			
		Select			
		Standardize			
		Support			
		Use			

 5

INTRODUCTION

Body of Knowledge structure

- Unit (U)
  The syllabus is presented by syllabus areas; each called a 'Unit'. The chapters in the book 'Climbing the Mountain' reflect the 'Units' described in this syllabus.
- Learning Element (E)
  Each 'Unit' consists of a number of 'Elements'. The paragraphs in each chapter of the book 'Climbing the Mountain' reflect the 'Elements' in this syllabus.
- Performance Criteria (PC)
  Each 'Element' consists of a number of 'Performance Criteria' and each 'Performance Criteria' has an explanation. These describe the tools, techniques and competencies that are required.
- Bloom level
  A 'Cognitive Level' has been assigned to each 'Performance Criteria'- description according to Bloom's Taxonomy. This defines at which level the Belt is expected to apply the respective tool, technique or skill.

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INTRODUCTION

Body of Knowledge Bloom Levels

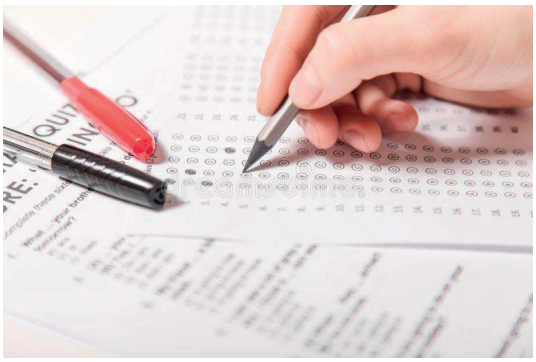
- Level I – Remember
  Recall or recognize terms, definitions, facts, ideas, materials, patterns, sequences, methods, principles, etc.
- Level II – Understand
  Read and understand descriptions, communications, reports, tables, diagrams, directions, regulations, etc.
- Level III – Apply
  Know when and how to use ideas, procedures, methods, formulas, principles, theories, etc.
- Level IV – Analyze
  Break down information into its constituent parts and recognize their relationship to one another and how they are organized; identify sublevel factors or salient data from a complex scenario.

 7

INTRODUCTION

Sample Exam

- As part of the training a sample exam paper is provided to candidates with answers and rationales.
- This can be used by the candidates to prepare for the exam.



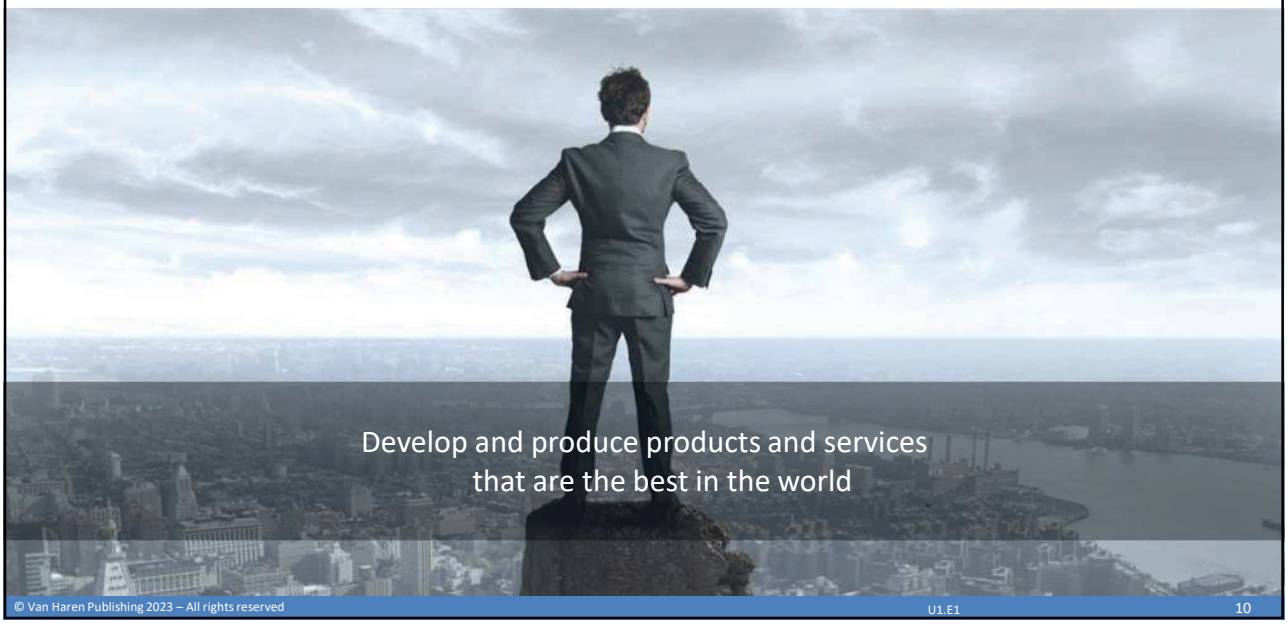
 8

U1 – WORLD CLASS

E1 – CONTINUOUS IMPROVEMENT

 9

CONTINUOUS IMPROVEMENT HISTORY



 U1.E1 10

CONTINUOUS IMPROVEMENT HISTORY


1950 →
Deming
Q & PDCA


1950 - 1970
Nakajima
TPM


1950 →
Ohno & Shingo
Toyota TPS


1986 →
Imai
Kaizen


1911
Taylor
Scientific mngt

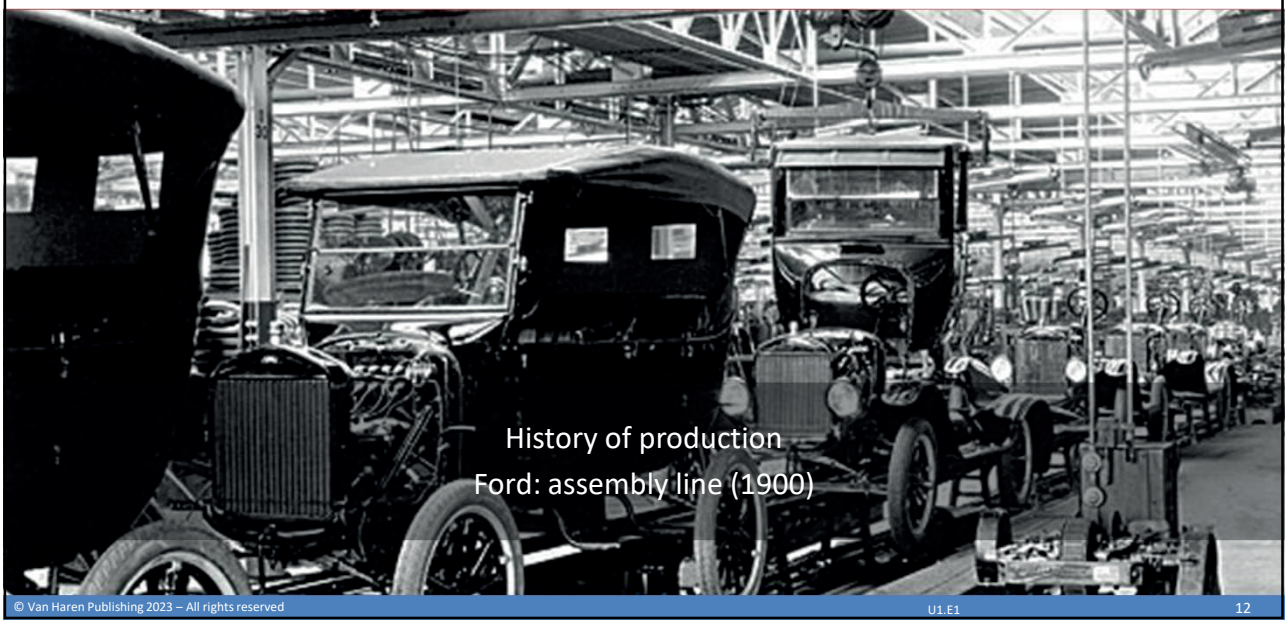

1912
Ford
Belt (Flow)


1979 – 1986 →
B. Galvin, Smith & Harry
Six Sigma Motorola

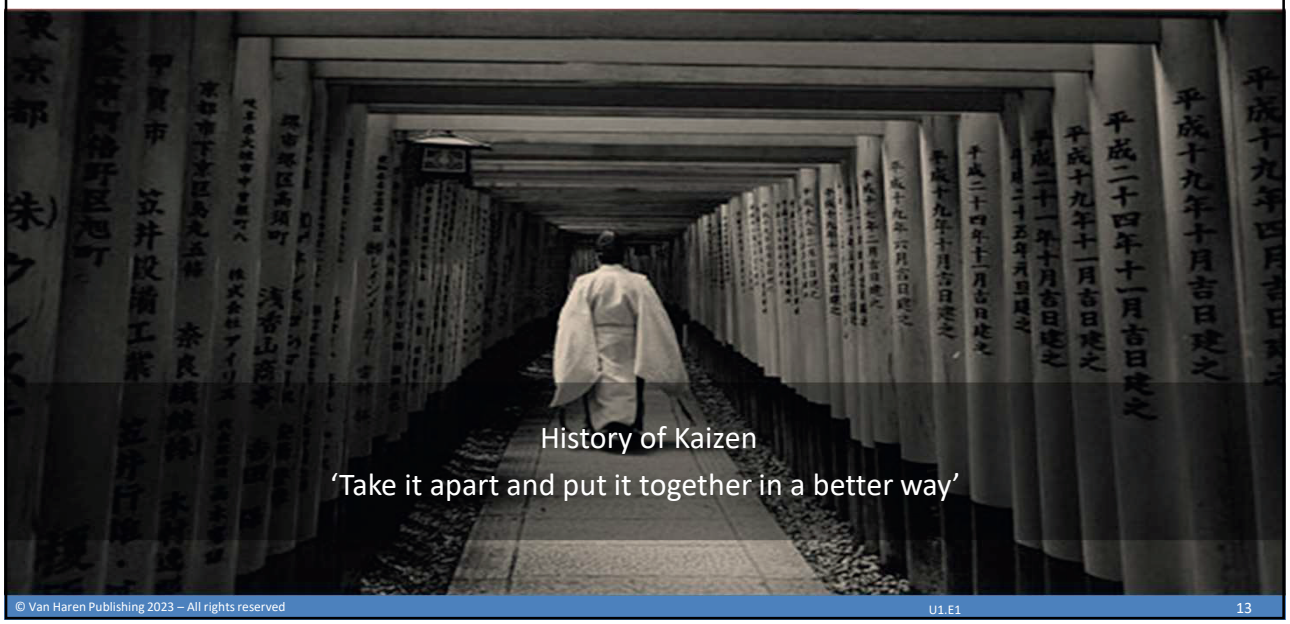
1991 - 1996
Womack & Jones
Lean


1996 →
Jack Welch
Six Sigma GE

CONTINUOUS IMPROVEMENT HISTORY



CONTINUOUS IMPROVEMENT HISTORY



History of Kaizen

'Take it apart and put it together in a better way'

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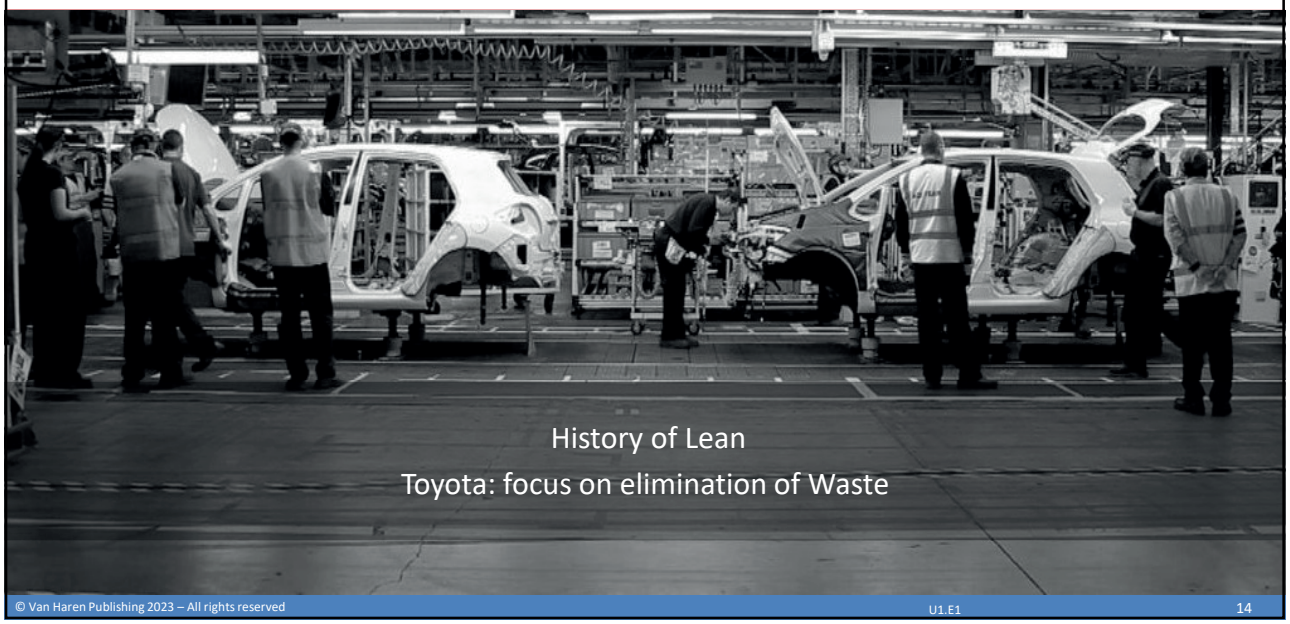
CONTINUOUS IMPROVEMENT HISTORY



History of Lean

Toyota: focus on elimination of Waste

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CONTINUOUS IMPROVEMENT HISTORY

History of Six Sigma

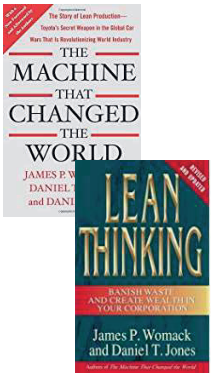
Motorola: focus on reducing variation

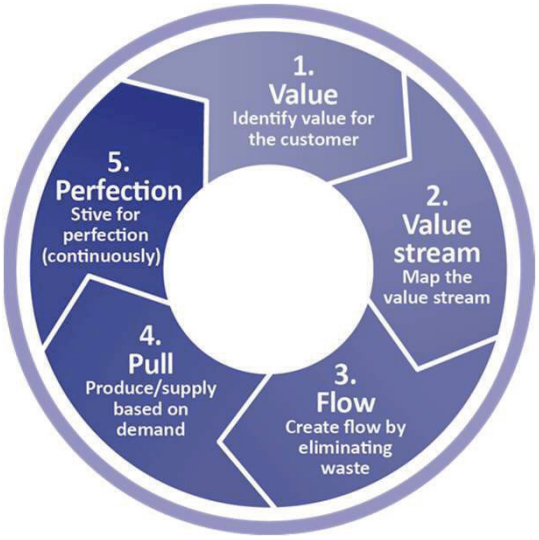
CONTINUOUS IMPROVEMENT VALUES AND PRINCIPLES

Lean Thinking

J.P. Womack

D.T. Jones





CONTINUOUS IMPROVEMENT VALUES AND PRINCIPLES

Muda:
Waste, uselessness, non-value added or idleness.

Muri:
Overburden, impossible, beyond one's power or excessiveness.

Mura:
Unevenness, irregularity or lack of uniformity.

1. Over-production
2. Waiting
3. Transport
4. Over-processing
5. Inventory
6. Movement
7. Defects
8. Unused expertise

CONTINUOUS IMPROVEMENT VALUES AND PRINCIPLES

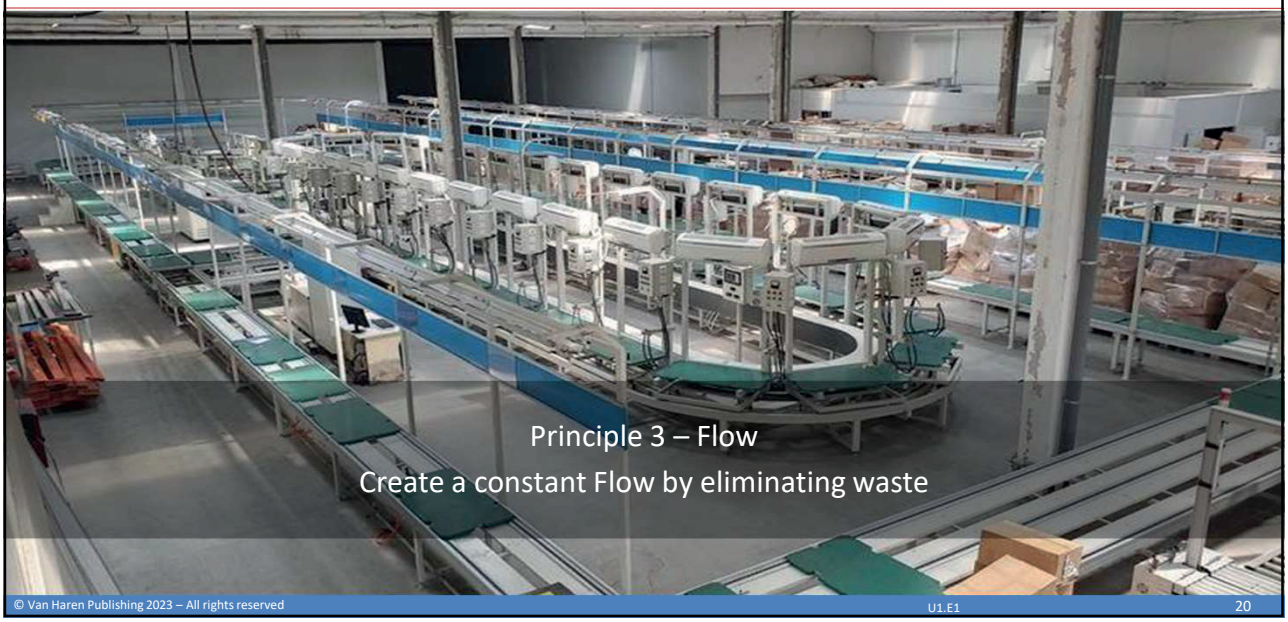
Principle 1 – Value
Determine what adds value to the customer

CONTINUOUS IMPROVEMENT VALUES AND PRINCIPLES

Principle 2 – Value stream

Map the value stream

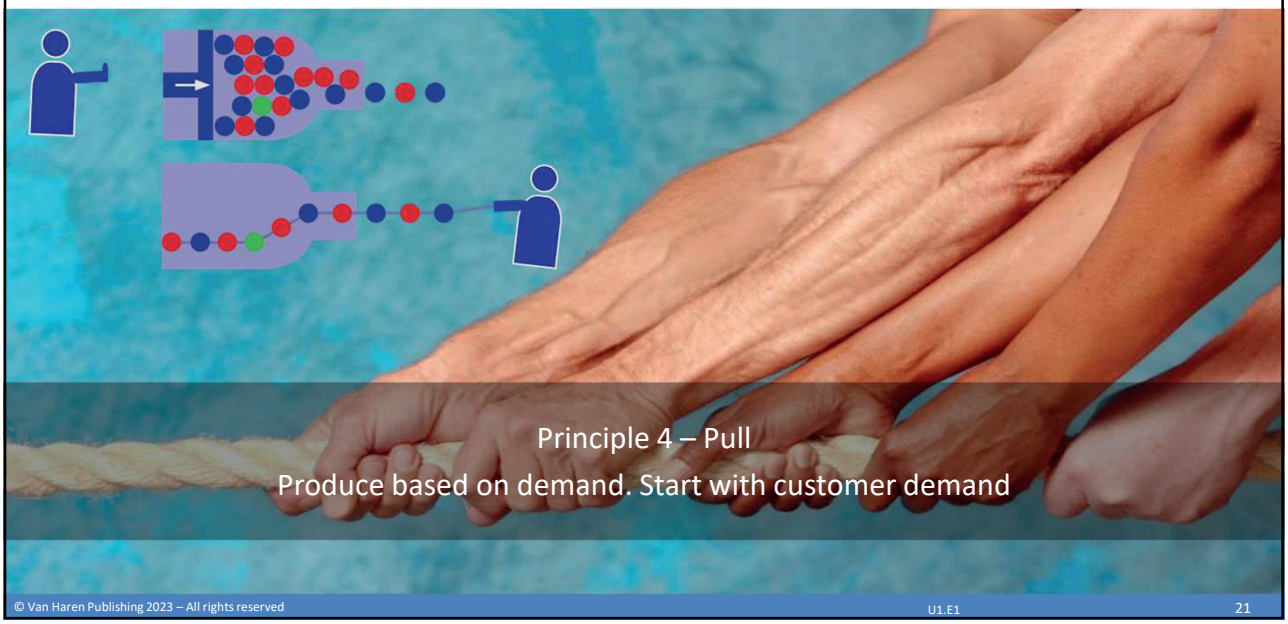
CONTINUOUS IMPROVEMENT VALUES AND PRINCIPLES



Principle 3 – Flow

Create a constant Flow by eliminating waste

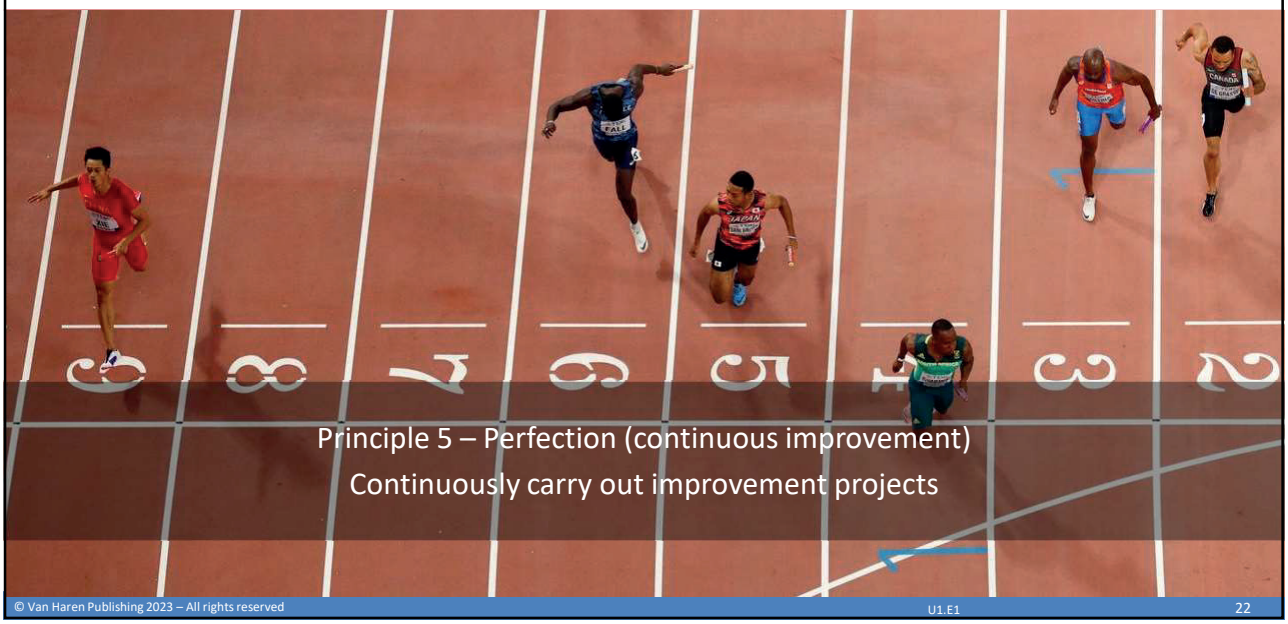
CONTINUOUS IMPROVEMENT VALUES AND PRINCIPLES



Principle 4 – Pull

Produce based on demand. Start with customer demand

CONTINUOUS IMPROVEMENT VALUES AND PRINCIPLES



Principle 5 – Perfection (continuous improvement)

Continuously carry out improvement projects