CONCURRENT ENGINEERING (CE) & Six Sigma (6σ)

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What is Concurrent Engineering?

1. Suatu filosofi pengembangan produk:
   - mengintegrasikan issu disain yang beragam
2. Suatu metode disain produk:
   - mengintegrasikan pemikiran masyarakat yang beragam menjadi suatu Disain Tim .
3. Suatu metode “mengatur” orang-orang:
   - issu disain disampaikan kepada masyarakat.

Tujuan CE adalah mengintegrasikan berbagai disiplin yang berbeda yang dapat menghasilkan produk yang lebih baik

Minimize the product life cycle (PLC) – Menghilangkan prosedur redisain (rancang ulang).

Decrease production cost – akibat meminimumkan PLC.

Maximize product quality – dengan mencurahkan lebih banyak waktu dan biaya pada awalnya dalam siklus disain dan memastikan bahwa konsep seleksi optimal → dapat meningkatkan prospek penyampaian barang berkualitas kepada pelanggan.

Team Work – SDM bekerja bersama untuk menghasilkan suatu produk yang berkualitas..

Evolution of Quality

Reactive Quality
Quality Checks (QC) - Taking the defectives out of what is produced

Proactive Quality
“Create process that will produce less or no defects”

Historically

Contemporary

What Is Six Sigma?

σ

Sigma is a letter in the Greek Alphabet

- Degree of variation
- Level of performance in terms of defects;
- Statistical measurement of process capability
- Benchmark for comparison
- Process improvement methodology
- It is a Goal
- Strategy for change
- A commitment to customers to achieve an acceptable level of performance


What is Six Sigma?

- It is a methodology for continuous improvement
- It is a methodology for creating products/processes that perform at high standards
- It is a set of statistical and other quality tools arranged in unique way
- It is a way of knowing where you are and where you could be!
- It is a Quality Philosophy and a management technique

Six Sigma Definitions

- **Business Definition**
  - ✓ A break through strategy to significantly improve customer satisfaction and shareholder value by reducing variability in every aspect of business.
- **Technical Definition**
  - ✓ A statistical term signifying **3.4** defects per million opportunities.

Six Sigma (6σ)

- Six Sigma suatu pendekatan yang tepat untuk mencapai terobosan-terobosan perbaikan dalam proses produksi dan bisnis.

- Six Sigma adalah suatu konsep yang mencoba meminimumkan kerusakan mendekati 3.4 kerusakan per juta kejadian (defects per million opportunity = DPMO)

Six Sigma is not:

- A standard
- A certification
- Another metric like percentage

It is a Philosophy

- Anything less than ideal is an opportunity for improvement
- Defects cost money
- Understanding processes and improving them is the most efficient way to achieve lasting results

It is a Process

- To achieve this level of performance you need to:

  Define, **M**easure, **A**nalyse, **I**mprove and **C**ontrol

It is Statistics

- 6 Sigma processes will produce less than 3.4 defects per million object (opportunities)

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Path to Six Sigma

Sigma levels and DPMO

6 Sigma	3.4 Defects
5 Sigma	233 Defects
4 Sigma	6,210 Defects
3 Sigma	66,807 Defects
2 Sigma	308,537 Defects

Motorola
the company that invented Six Sigma

- The term “Six Sigma” was coined by Bill Smith, an engineer with Motorola
- Late 1970s - Motorola started experimenting with problem solving through statistical analysis
- 1987 - Motorola officially launched it’s Six Sigma program

Perkembangan Six Sigma

GE
Perusahaan yang menyempurnakan Six Sigma

- Jack Welch menerapkan Six Sigma di GE pada Januari 1996
- Model GE model untuk perbaikan proses

Define → Measure → Analyze → Improve → Control

Combination of change management & statistical analysis

Perkembangan Six Sigma

GE

DU PONT

MOTOROLA
intelligence everywhere

TEXAS INSTRUMENTS

NASA
NATIONAL AERONAUTICS
AND SPACE ADMINISTRATION

Honeywell

USAF

intel

hp
invent

What can it do?

Motorola:

- 5-Fold growth in Sales
- Profits climbing by 20% pa
- Cumulative savings of $14 billion over 11 years

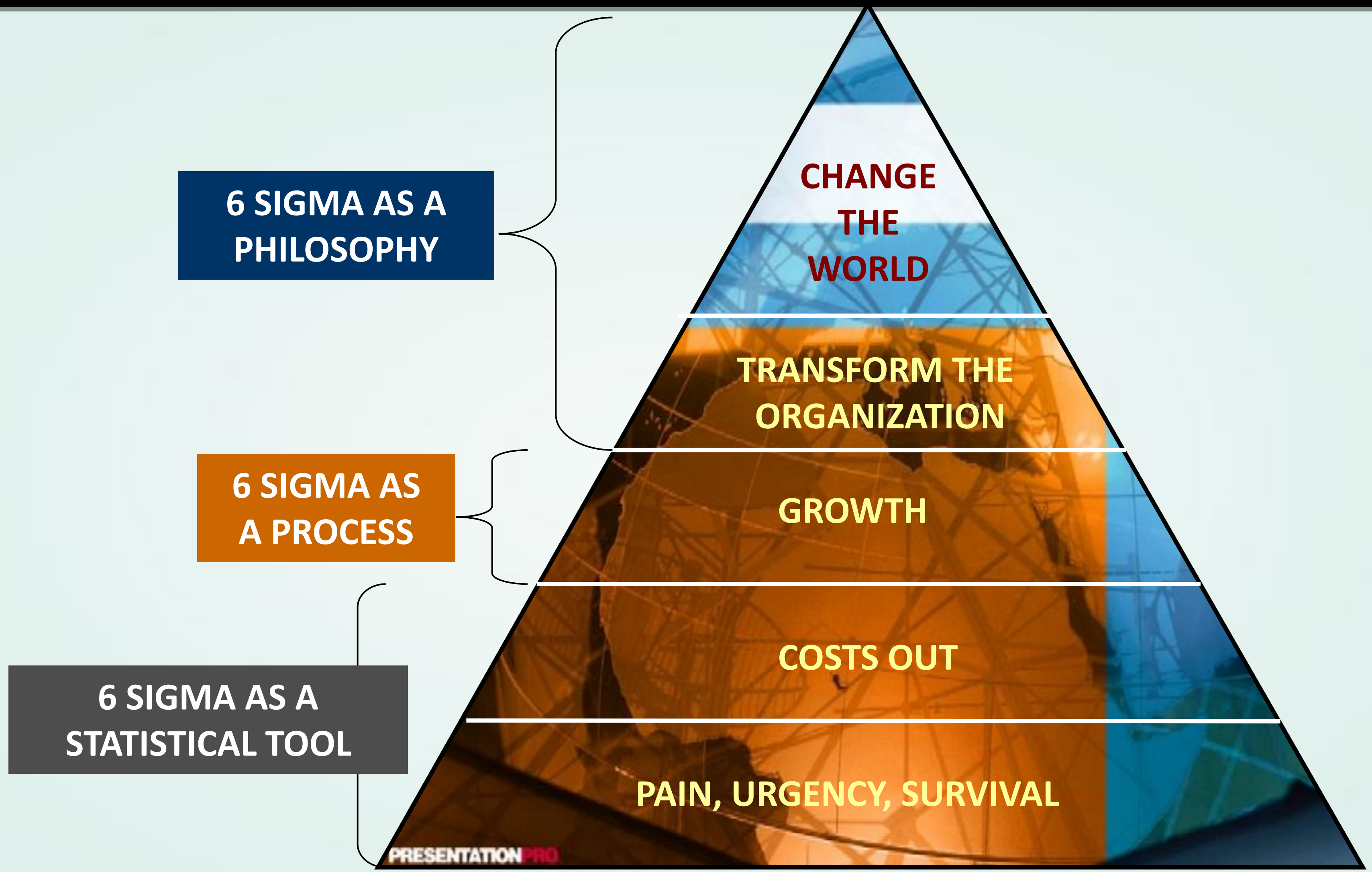
General Electric:

- $2 billion savings in just 3 years
- The no.1 company in the USA

Bechtel Corporation:

- $200 million savings with investment of $30 million

Overview of Six Sigma



Metodologi Six Sigma

BPMS
Business Process Management System

DMAIC
Six Sigma Improvement Methodology

DMADOV
Creating new process which will perform @ Six Sigma

Tujuan BPMS

- Untuk memahami proses; misi, aliran dan cakupan
- Untuk mengetahu pelanggan dan ekspektasi mereka
- Untuk mengidentifikasi, monitor dan meningkatkan ukuran kinerja proses

What is DMAIC ?

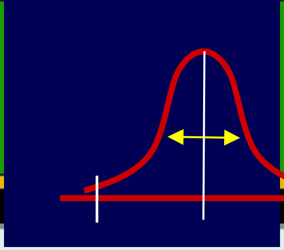
- Pendekatan yang logis dan terstruktur terhadap penyelesaian masalah dan perbaikan proses.
- Suatu proses yang iteratif (continuous improvement).
- Instrumen mutu yang fokus terhadap manajemen perubahan.

E	=	**Q**	x	**A**
Effectiveness		Quality Improvement		Acceptance

The Approach

- Practical Problem
- Statistical Problem
- Statistical Solution
- Practical Solution

Methodology



D Define — Identify and state the practical problem

M Measure — Validate the practical problem by collecting data

A Analyze — Convert the practical problem to a statistical one, define statistical goal and identify potential statistical solution

I Improve — Confirm and test the statistical solution

C Control — Convert the statistical solution to a practical solution

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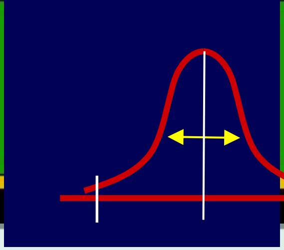
Define



D
Define

M
Measure

A
Analyze

I
Improve

C
Control

- Who wants the project and why ?
- The scope of project / improvement
- Key team members / resources for the project
- Critical milestones and stakeholder review
- Budget allocation

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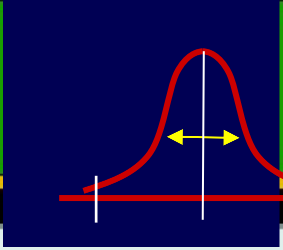
Measure



D
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Ensure measurement system reliability

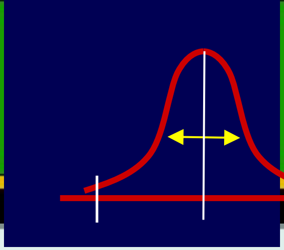
- Is tool used to measure the output variable flawed ?
- Do all operators interpret the tool reading in the same way ?

Prepare data collection plan

- How many data points do you need to collect ?
- How many days do you need to collect data for ?
- What is the sampling strategy ?
- Who will collect data and how will data get stored ?
- What could the potential drivers of variation be ?

Collect data

Analyze



D Define

M Measure

A Analyze

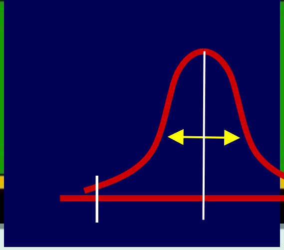
I Improve

C Control

- Understand statistical problem
- Baseline current process capability
- Define statistical improvement goal
- Identify drivers of variation (significant factors)

A

Improve



D
Define

M
Measure

A
Analyze

I
Improve

C
Control

- Map improved process
- Pilot solution
- Identify operating tolerance on significant factors

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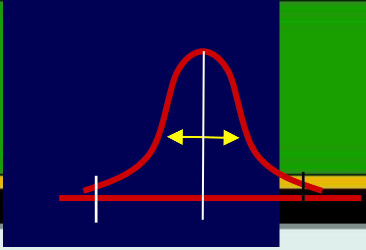
Control



D
Define

M
Measure

A
Analyze

I
Improve

C
Control

Ensure measurement system reliability for significant factors

- Is tool used to measure the input / process variables flawed ?
- Do all operators interpret the tool reading in the same way ?

Improved process capability

Sustenance Plan

- Statistical Process Control
- Mistake Proofing
- Control Plan

C

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Thank you

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