INTEGRATED QUALITY MANAGEMENT TRAINING

(Albert Balogh)

Fig. 1

BODY OF KNOWLEDGE FOR QUALITY MANAGERS

TQM

EXCELLENCE MODELS

EFQM-MODEL

QMS

ISO 9001

INTEGRATED MANAGEMENT SYSTEMS

ISO (9001+14001+18001+27001)

PROCESS MANAGEMENT

CONTINUOUS IMPROVEMENT

PROBLEMSOLVING MODELS

SIX SIGMA

LEAN MANAGEMENT

LEAN SIX SIGMA

QUALITY TOOLS
Fig. 2  Knowledge criteria for Quality System Managers in EOQ-CoS 9000-2009
1. Quality management
2. Organisation of the quality function
3. Process management principles
4. Quality improvement techniques
5. Resource management
6. Quality in logistics, sales and after sales services
7. Design and development process management
8. Purchasing and subcontracting
9. Production and service processes
10. Monitoring and measurement of processes/product
11. Data collection and analysis, statistical methods
12. Inspection, Testing and Metrology
13. Control of nonconformity
14. Social aspects
15. Legal and regulatory aspects

NOT COVERED BY BOK

Fig. 3  COMPARISON BOK FOR QUALITY MANAGERS and EOQ CoS 9000

TQM (1)

EXCELLENCE MODELS (1)
EFQM-MODEL

QMS (2)-(13)
ISO 9001

INTEGRATED MANAGEMENT SYSTEMS
ISO (9001+14001+18001+27001)

PROCESS MANAGEMENT (3)
CONTINUOUS IMPROVEMENT (4)
PROBLEMSOLVING MODELS (4)
SIX SIGMA
LEAN MANAGEMENT
LEAN SIX SIGMA
QUALITY TOOLS (4), (11)
Fig. 4  Integrated Quality Management Training

Integrated definition for quality

Integrated Management Systems
Integrated improvement and quality tools
Integrated quality approach
Integrated PDCA cycles
Integrated quality and financial metrics

Fig. 5  INTEGRATED INTERPRETATION OF QUALITY FOR AN ORGANIZATION

OWNERS (SHAREHOLDERS)
NEEDS: income, profit, ROI>0.8

SOCIETY
Needs: safe environment, jobs

SUPPLIERS
Need: win-win relation

QUALITY (organization)

CUSTOMERS
Needs: good products

MANAGERS
Needs: carrier, success

EMPLOYEES
Needs: salary, recognition, progress working conditions

Figure of George Mikó
Fig. 6 Integrated interpretation quality for organization

ISO 9000:2005:
quality - degree to which a set of inherent characteristics fulfills requirements

ISO 9004:2009:
sustained success – (organization) result of the ability of an organization to achieve and maintain its objectives in the long term

ISO 9004:2009:
...to achieve the sustained success top management should identify all its relevant interested parties and determine how to meet their needs and expectations in a balanced way

quality of an organization - degree to which an organization meets the requirements of their interested parties in a balanced way

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Fig. 7 INTEGRATED MANAGEMENT SYSTEMS

ISO 14001 (EMS) ▸ ISO 18001-18002) (OHSAS) ▸ ISO 27001 -27002 (ISMS)

Integration with other management systems

ISO 9001 (QMS)

Integration with other sector management systems

ISO TS 16949 (Automotive sector) ▸ ISO 22000 (Food industry) ▸ GMP,GLP,GXP (Pharmaceutical sector)
Fig. 8 Model of a process based quality management system

Fig. 9 Product PDCA

7.1 Planning of product realization

ISO 9001 7.1 Plan

ISO 9001 7.5. Do

8.5 Improvement

ISO 9001 8.5. Act

8.2.4 Monitoring and measurement of product

ISO 9001 8.2.4 Check

7.5. Production and service provision
**Fig. 10 Process PDCA**

7.1 Planning of product realization

ISO 9001

7.1. Plan

8.5 Improvement

ISO 9001

7.5. Production and service provision

ISO 9001

7.5. Do

8.2.3 Monitoring and measurement of processes

ISO 9001

8.2.3. Check

8.5 Act

**Fig. 11 System PDCA**

5.4 Planning

ISO 9001

5.4. Plan

8.5 Improvement

ISO 9001

8.5. Act

4. Quality management system

ISO 9001

4. Do

8.2.2 Internal audit

ISO 9001

8.2.2 Check

8.5 Act

ISO 9001

8.5. Act
5.2 Customer focus

7.2. Customer-related processes

ISO 9001
5.2. Plan

ISO 9001
8.5. Act

ISO 9001
7.2. Do

ISO 9001
8.2.1 Check

8.2.1. Customer satisfaction

8.5 Improvement

Customer focus PDCA

Fig. 12 Customer focus PDCA

Fig. 13 Integrated PDCA in ISO 9001
1. **Problem and goal description**
   - Flowchart

2. **Data collection**
   - Data sheet

3. **Data process**
   - Histogram

4. **Cause detection**
   - Pareto diagram

5. **Root-cause detection and solution search**
   - Ishikawa diagram

6. **Evaluation**
   - SPC chart and Scatter diagram

7. **Implementation**
   - SPC chart

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**Goal: time reduction**

- **Data collection**
  - Random time points

- **Data process**
  - Frequency analysis

- **Time management**

- **Cause detection**
  - Pareto diagram

- **Root causes – solutions**

- **Implementation**
  - Evaluation
    - Individual control chart

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**Fig.14**

**7 problem solving steps**

**7 basic quality tools**

**Fig.15**

**Home work**
Fig. 16
Time points for observation (25 observations per days) – 5 days in a week – 8 weeks -40 days – 1000 observations

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>6.35</td>
</tr>
<tr>
<td>Tuesday</td>
<td>6.28</td>
</tr>
<tr>
<td>Wednesday</td>
<td>6.05</td>
</tr>
<tr>
<td>Thursday</td>
<td>6.45</td>
</tr>
<tr>
<td>Friday</td>
<td>6.23</td>
</tr>
<tr>
<td></td>
<td>7.18</td>
</tr>
<tr>
<td></td>
<td>7.45</td>
</tr>
<tr>
<td></td>
<td>7.02</td>
</tr>
<tr>
<td></td>
<td>6.59</td>
</tr>
<tr>
<td></td>
<td>7.32</td>
</tr>
<tr>
<td></td>
<td>8.12</td>
</tr>
<tr>
<td></td>
<td>10.43</td>
</tr>
<tr>
<td></td>
<td>9.45</td>
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<tr>
<td></td>
<td>7.58</td>
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<tr>
<td></td>
<td>9.43</td>
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<td></td>
<td>9.34</td>
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<tr>
<td></td>
<td>11.02</td>
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<td>10.32</td>
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<td></td>
<td>8.39</td>
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<td></td>
<td>10.21</td>
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<tr>
<td></td>
<td>11.14</td>
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<td>12.31</td>
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<td></td>
<td>11.09</td>
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<tr>
<td></td>
<td>9.06</td>
</tr>
<tr>
<td></td>
<td>10.49</td>
</tr>
</tbody>
</table>

Fig. 17  Frequency analysis for home time management

<table>
<thead>
<tr>
<th>Code</th>
<th>Activity</th>
<th>Frequency</th>
<th>Percents</th>
<th>Hours per day</th>
<th>Average hours per day</th>
<th>Goal hours per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Watching TV</td>
<td>108</td>
<td>10.8</td>
<td>77.76</td>
<td>1.94</td>
<td>1.5</td>
</tr>
<tr>
<td>B</td>
<td>Sleeping</td>
<td>97</td>
<td>9.7</td>
<td>69.84</td>
<td>1.75</td>
<td>1.5</td>
</tr>
<tr>
<td>C</td>
<td>Leisure</td>
<td>70</td>
<td>7.0</td>
<td>50.40</td>
<td>1.26</td>
<td>1.0</td>
</tr>
<tr>
<td>D</td>
<td>Commuting to and from work</td>
<td>68</td>
<td>6.8</td>
<td>48.96</td>
<td>1.24</td>
<td>1.0</td>
</tr>
<tr>
<td>E</td>
<td>Meals at home</td>
<td>56</td>
<td>5.6</td>
<td>40.32</td>
<td>1.00</td>
<td>1.0</td>
</tr>
<tr>
<td>F</td>
<td>Housekeeping</td>
<td>51</td>
<td>5.1</td>
<td>36.72</td>
<td>0.92</td>
<td>0.9</td>
</tr>
<tr>
<td>G</td>
<td>Showers</td>
<td>43</td>
<td>4.3</td>
<td>30.96</td>
<td>0.77</td>
<td>0.8</td>
</tr>
<tr>
<td>H</td>
<td>Reading</td>
<td>40</td>
<td>4.0</td>
<td>28.8</td>
<td>0.72</td>
<td>1.5</td>
</tr>
<tr>
<td>I</td>
<td>Yardwork</td>
<td>33</td>
<td>3.3</td>
<td>23.76</td>
<td>0.59</td>
<td>0.7</td>
</tr>
<tr>
<td>J-K</td>
<td>Parties-Hobbies</td>
<td>30</td>
<td>3.0</td>
<td>21.60</td>
<td>0.54</td>
<td>0.8</td>
</tr>
<tr>
<td>L+M</td>
<td>Bills+Financial administration</td>
<td>4</td>
<td>0.4</td>
<td>2.88</td>
<td>0.07</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Source: Patrick M. Courtney: Time Management Using Quality Tools, Quality Progress, 2005 August
### Fig. 18  Frequency analysis for office time management

<table>
<thead>
<tr>
<th>Code</th>
<th>Activity</th>
<th>Frequency</th>
<th>Percents</th>
<th>Hours per day</th>
<th>Average hours per day</th>
<th>Goal hours per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>Phones, e-mails</td>
<td>52</td>
<td>5,2</td>
<td>37,44</td>
<td>0,94</td>
<td>0,5</td>
</tr>
<tr>
<td>O</td>
<td>Training preparation</td>
<td>48</td>
<td>4,8</td>
<td>34,56</td>
<td>0,865</td>
<td>1,5</td>
</tr>
<tr>
<td>P</td>
<td>Lunch and brake at work</td>
<td>48</td>
<td>4,8</td>
<td>34,56</td>
<td>0,865</td>
<td>0,6</td>
</tr>
<tr>
<td>Q</td>
<td>Measurement administration</td>
<td>44</td>
<td>4,4</td>
<td>31,68</td>
<td>0,79</td>
<td>0,8</td>
</tr>
<tr>
<td>R</td>
<td>General quality stuff</td>
<td>40</td>
<td>4,0</td>
<td>28,80</td>
<td>0,72</td>
<td>0,7</td>
</tr>
<tr>
<td>S</td>
<td>Statistical research</td>
<td>36</td>
<td>3,6</td>
<td>25,92</td>
<td>0,65</td>
<td>0,65</td>
</tr>
<tr>
<td>T</td>
<td>Quality management training</td>
<td>34</td>
<td>3,4</td>
<td>24,48</td>
<td>0,61</td>
<td>0,7</td>
</tr>
<tr>
<td>U</td>
<td>Staff meeting</td>
<td>28</td>
<td>2,8</td>
<td>20,16</td>
<td>0,5</td>
<td>0,5</td>
</tr>
<tr>
<td>V</td>
<td>Reading scientific papers</td>
<td>26</td>
<td>2,6</td>
<td>18,72</td>
<td>0,47</td>
<td>0,45</td>
</tr>
<tr>
<td>X</td>
<td>Travel</td>
<td>26</td>
<td>2,6</td>
<td>18,72</td>
<td>0,47</td>
<td>0,4</td>
</tr>
<tr>
<td>Y</td>
<td>Continuing education</td>
<td>18</td>
<td>1,8</td>
<td>12,96</td>
<td>0,32</td>
<td>0,4</td>
</tr>
</tbody>
</table>

Source: Patrick M. Courtney: Time Management Using Quality Tools, Quality Progress, 2005 August

### Fig. 19

**Activity frequencies**

- **Home activities frequencies**
- **Office activities frequencies**
Fig. 20 Individual control chart

- Observed TV watching time after improvement

- Time in hours

- Days

- Observed time
- Average time
- Lower control limit for time
- Upper control limit for time

Fig. 21

- Time Management

- The Goal: Evaluate your daily life with reference to time

- The Problem: Why do people waste time?

- Be mindful of personal and professional goals
- Write everything down!
- Unrealistic expectations of time.
- Too lazy to make detailed plans.

- Solution No. 1: Creating More Time
- Delegate tasks.
- Work efficiently.

- Solution No. 2: Use Time Management Tools
- Keep a log of relevant activities
- Create and update Action Plans.
Fig. 22

Use financial metrics to justify the cost of quality improvement for management!

Quality metrics
1. Mean
2. Standard deviation
3. Sigma level
4. DPMO
5. SPC charts
6. Process capability
7. Pareto diagram

Financial metrics
1. Revenues
2. Costs
3. Savings
4. Margins
5. Return On Investment (ROI)
6. Operating leverage (DOE)
7. Break even analysis

Fig. 23 Project cost savings waterfall chart

Source: Peter J. Sherman and James G. Vono: All Ears, Quality Progress, 2009 July
Fig. 24 Break-even analysis

<table>
<thead>
<tr>
<th>Key metric</th>
<th>PMO</th>
<th>FMO</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit produced</td>
<td>10,000</td>
<td>10,000</td>
<td>NA</td>
</tr>
<tr>
<td>Retail price per unit</td>
<td>$120</td>
<td>$120</td>
<td>NA</td>
</tr>
<tr>
<td>Fixed costs</td>
<td>$395,000</td>
<td>$430,000</td>
<td>$35,000</td>
</tr>
<tr>
<td>Variable costs per unit</td>
<td>$58</td>
<td>$52</td>
<td>($6)</td>
</tr>
<tr>
<td>Break-even volume</td>
<td>6,371</td>
<td>6,324</td>
<td>(47)</td>
</tr>
<tr>
<td>Break-even revenue</td>
<td>$764,520</td>
<td>$758,880</td>
<td>($5,640)</td>
</tr>
</tbody>
</table>

PMO = present method of operation  
FMO = future method of operation

Source: Peter J. Sherman and James G. Vono: All Ears, Quality Progress, 2009 July

Fig. 25

Integrated Quality Approach → The Quality Bridge

ISO 9001 → Lean Six Sigma → Excellence

Process Management → Project Management

Requirements → Methods → Sustained success

What? → How? → Result!