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| **SC21 Programme** |
| Manufacturing Excellence Assessment Toolset |
| **Diagnostic and Management Commitment**  **Document Reference – MxT01**  **Version – 3**  **Date – July 2019**  Prepared by - The SC21 Performance, Development and Quality (PDQ) Special Interest Group (SIG) |

# Document History

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| Date | Version | Author(s) | Summary of Changes | Approved by |
| Dec 2013 | 1 | Peter Laurie | 2013 Issue. (This and any previous documents not version controlled) | PDQ SIG |
| May 2019 | 2 | Ross Harrison | Formatting, Document structure, Addition of Production / Service Planning diagnostic, 5S 2 diagnostic elements combined into 1,  Additional look-fors and references to common tools / practice throughout diagnostic | PDQ SIG |

# Scope of Applicability

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| SC21 Lite | SC21 OE | SC21 C+G |
| Y | **Y** | **N** |

# Associated Documents

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| Document Title | Document No. |
| Manufacturing Excellence Process Guide | MxP01 |
| Manufacturing Excellence Scoring Workbook | MxT02 |
| Manufacturing Excellence Report Template | MxT03 |

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# Introduction and Context

#### Assessment Process

Information on deployment and use of this assessment can be found in the Manufacturing Excellence Process Overview document, available from the SC21 web page: - <http://www.sc21.org.uk/sc21-tools/sc21-manufacturing-excellence-diagnostics/>

#### Assessment Approach

The basis of this assessment is the SC21 Manufacturing Excellence Lean Framework which comprises the Diagnostic Matrix and Management Commitment Assessment (with EFQM based “RADAR” Scoring).



Figure 1: Manufacturing Excellence Lean Framework

#### Practitioners

This assessment should be conducted by trained practitioners as per the process overview document. Assessment scores will only be accepted for SC21 recognition where the assessment has been conducted by practitioners who have been trained and verified under the SC21 programme (as listed on the SC21 website).

A self-assessment version of this assessment toolset is also available for those wishing to conduct assessments for their own purposes (SC21 Lite).

#### Acronyms

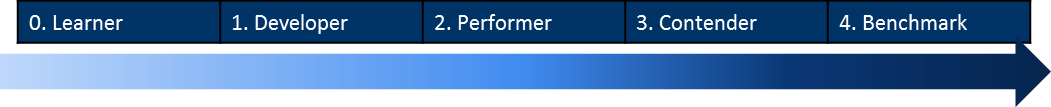
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| OFI – Opportunity for Improvement | CSIP – Continuous Sustainable Improvement Plan |
| DLF – Direct Line Feed | DSA – Delivery Schedule Achievement |
| EFQM – European Foundation for Quality Management | EBQ – Economic Batch Quantity |
| EOQ – Economic Order Quantity | MRP – Manufacturing Resource Planning |
| NVA – Non Value Added | NVQ – National Vocational Qualification |
| OEE – Overall Equipment Effectiveness | RC & CA – Root Cause and Corrective Action |
| SMART – Specific, Measurable, Achievable, Realistic, Time bound | SMED – Single Minute Exchange of Die |
| SPC – Statistical Process Control | SUR – Set Up Reduction |
| TPM – Total Productive Maintenance | VSM – Value stream Map |
| WIP – Work in Progress | 7QT – 7 Quality Tools |
| NPI – New Product Introduction | APQP – Advanced Product Quality Planning |
| PPAP – Production Part Approval Process | MSA – Measurement Systems Analysis |
| FMEA – Failure Mode and Effects Analysis | ERP – Enterprise Resource Planning |
| CPK – Process Capability Index / Ratio |  |

# Section 1 – Diagnostic Assessment

#### Scoring Methodology

Scoring the 20 element Manufacturing Excellence ‘Diagnostic’ assessment follows a consistent framework, reflecting the maturity of deployment of the various improvement Tools & Techniques.

The “Expectations” provide guidance to the Practitioner and Company involved for scoring between 0 and 4.



It is accepted that the terminology used within a Diagnostics may not align directly with the commodity or service being assessed. In these instances the diagnostic must be interpreted appropriately by the Practitioner to match the situation in order to provide realistic and valued feedback of Strengths and Opportunities for Improvement.

The key outputs of the Diagnostic assessment are Strengths and Opportunities for Improvement. Strengths can be used as standards or examples of best/good practice and cascaded to other cells or parts of the business. Opportunities for Improvement can be analysed for benefit to the business, action taken and incorporated in the Continuous Sustainable Improvement Plan (CSIP).

## Diagnostic Scoring Matrix



### DIAGNOSTIC 1: Production / Service Planning

How the production/delivery plan is generated and is integrated with other systems and processes.

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| --- | --- | --- | --- | --- | --- | --- |
| 0. Learner | | 1. Developer | 2. Performer | 3. Contender | | 4. Benchmark |
| Load & Capacity planning / Project Management is ad-hoc or not effective – reactive only | | Basic planning / Project Management approach, little cross functional engagement  Some consideration given to capacity at a high level | Average planning / Project Management approach, some cross functional engagement  Key aspects of Sales and Operations Planning considered, perhaps managed in offline system  Critical path activities understood | Sales and Operations Planning well considered and utilised with some visual management.  Well integrated with core business system  Good cross functional engagement  Clear understanding of load & capacity, perhaps some opportunity for improvement in detail or standard time accuracy | | Excellent Planning / Project Management process, fully system integrated and highly automated  Full Sales and Operations Planning process in place, visually managed with full cross functional engagement  Capacity planning timeframes and levels of detail are appropriate (Long and short term views)  Standard times regularly reviewed and accurate |
| Look  For: | * Business system (MRP/ERP) used to generate plan based on accurate capacity modelling * Sales & Operations Planning process visually managed * Inputs to capacity planning model may include: OEE data, Planned Maintenance, Holidays & Shut downs * People resource allocation linked to Skills Matrix * Management of arrears, rework etc. in capacity plan | | | | * Demand Forecasting in place, forecast accuracy measured * Consideration of NPI / NPI process in place * Priorities are identified & managed * Project management tools / systems * Links to Quality, APQP, PPAP, FMEA, Design for Manufacture, Design for 6 Sigma etc. processes | |

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### DIAGNOSTIC 2: Visual Control - Delivery Schedule Achievement

How the work area communicates the production/delivery plan and takes corrective actions.

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| 0. Learner | | 1. Developer | 2. Performer | 3. Contender | | 4. Benchmark |
| No visual  indication of production/  delivery plan exists | | Planned schedules are displayed as paper copies, no record of variance  Little / no team involvement / understanding | In the work area , a clear visual display of planned vs. actual production/delivery is evident  Information is not time specific  Reasons for variance and corrective action not recorded  Team understanding | In the work area , a clear visual display of planned versus actual production/delivery is evident  Time period should be as appropriate, e.g. hourly, daily or weekly  Reasons for variance and corrective action not recorded  Plan communicated and understood by team | | In the work area, a clear visual display of planned versus actual production/delivery is evident  Time period should be appropriate, e.g. hourly, daily or weekly  Reasons for variance and corrective action are recorded  Plan communicated and understood by team  Subject to continual review and updated by work area members |
| Look  For: | * Work to list on Visual Control or on computers at all work stations * Overall progress of Production Plan or DSA * Business system (MRP) schedule translated as simplified Visual Control * Control period, e.g. hourly, daily, weekly | | | | * Shortage Lists (MRP or manual generation) * Documented variance and corrective actions with responsibilities and timescales noted * Inventory levels are recorded * Commitment by all to meet delivery performance * Priorities are identified | |

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### DIAGNOSTIC 3: Visual Control - Non-conformance

How the work area communicates and monitors the impact of non-conformance.

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| 0. Learner | | 1. Developer | 2. Performer | 3. Contender | | 4. Benchmark |
| No monitoring of Cost of Quality and / or non-conformance | | Non-conformance monitored but not displayed | Actual scrap / non-conformance levels displayed, but no target  Subject to review, historical records exist  Team understanding | Scrap or non-conformance cost documented (perhaps not displayed)  Actual defect levels are compared with work area or departmental target and are improving  Scrap / non-conformance analysis and corrective actions displayed (perhaps not topical)  Subject to review, historical records exist  Team understanding | | Scrap or non-conformance cost is displayed and understood by all in the work area  Defect levels compare favourably with work area or departmental target and are reducing  Scrap / non-conformance analysis and corrective actions displayed and topical  Subject to review, historical records exist and are analysed to generate improvements  Team understanding  Links to CSIP |
| Look  For: | * Non-conformance e.g. scrap, defects, wastage, concessions, rework, incorrect documentation * Analysis of reasons for non-conformance – pareto charts, fishbone diagrams * Root cause and corrective action mechanisms | | | | * Target versus actual non-conformance levels * Cost of Quality (i.e. Prevention, Inspection, Rework/Repair) * Quality improvement teams are active * Improvement plan | |

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### DIAGNOSTIC 4: Visual Control - Improvement Activities

How the work area ensures visibility of improvement initiatives.

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| 0. Learner | | 1. Developer | 2. Performer | 3. Contender | | 4. Benchmark |
| No cell / department visual control in use | | Information displayed is of a general nature, e.g. process improvement tools, health & safety  No team understanding | Improvement plans / activities displayed but lack sufficient detail to effectively progress issues  Visual control is not topical  Some team understanding | Topical visual control, displaying what improvement activities are actually taking place  Activities are time bound with responsibilities indicated  Daily / weekly meetings centred around the visual control  Targets are not shown  Team understanding | | Topical visual control, displaying what improvement activities are actually taking place – links to CSIP  Activities are time bound with responsibilities indicated  Daily / weekly meetings centred around the visual control  Targets are shown for all improvements e.g. quality, delivery, cycle time  Team buy in and understanding |
| Look  For: | * Local visual control - notice board, on screen * Main / major improvement initiatives * Mechanism for employee suggestions * Before & after information * Ownership of visual control (evidence of team meetings) | | | | * Quantified benefits * Type of information displayed * Historical information * Topicality and active use of visual control * Activities have SMART objectives | |

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### DIAGNOSTIC 5: Visual Control - Skill Matrices

How the work area monitors current and future skills requirements.

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| 0. Learner | | 1. Developer | 2. Performer | 3. Contender | | 4. Benchmark |
| Skills matrix not considered  “Team Leader knows all team skills” | | Not all skills have been identified  Skills matrices not displayed | Skills are aligned to current capacity demand  Skills matrices displayed showing current skills  Future skills or training not identified | Most skills are aligned to current and planned capacity demand  Skills matrices displayed showing current and future skill requirements  Evidence exists that competencies are actively used and updated | | All relevant skills for the area are identified on the matrix, including ‘soft skills e.g. 5S, 7 Quality Tools, 7 Wastes  Skills are aligned to current and planned capacity demand  Skills matrices displayed showing current and future skill requirements  Evidence exists that competencies are actively used and updated  Training programme in place to support future requirements (not necessarily displayed) |
| Look  For: | * Cross skilling and how this contributes to effective resource utilisation * Visible skills matrices * Process for identifying current and future skills requirements (e.g. color coded) | | | | * Operator incentives to acquire additional competencies * Links to NVQ’s * Training Programmes * Competencies required within the work area / department | |

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### DIAGNOSTIC 6: 5S Workplace Organisation

How the work area deploys a structured approach to workplace organisation and cleanliness.

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| 0. Learner | | 1. Developer | 2. Performer | 3. Contender | | 4. Benchmark |
| Not practised  Cluttered storage  Locations not obvious  Very untidy - room for improvement | | Plan to implement 5S programme being developed  Some evidence of 5S practice perhaps from historic effort but not sustained | Average general environment and ‘Address and Place’  Some colour coding, marking and labelling  5S programme has started, some training done  5S standards being prepared and plan being implemented | Good general environment and ‘Address and Place’  Scope to improve 5S ‘Sustain’  5S standards or policy displayed  5S training conducted  5S assessments are conducted, results and actions are displayed  5S areas of responsibility displayed  Most pathways, storage areas, work areas, hazards, fire extinguisher and safety equipment are marked | | "Show room" level environment and “Address and Place”  5S ‘Sustain’ is evident & Sweep regularly practiced  5S standards or policy are displayed and agreed by all in cell.  All in work area trained in 5S  5S assessments are conducted regularly, results and actions are displayed  Pathways, storage areas, all work areas and hazards clearly marked  Fire extinguishers and safety equipment clearly marked  WIP, Materials, Tooling, consumables clearly marked and easily accessible.  Appropriate use of colour coding |
| Look  For: | * Defined 5S standards and/or policy * Accessibility and appropriate storage of materials, tools, sub-assemblies, WIP, product, consumables and process equipment – storage contents identified / labelled * Use of color coding * Obsolescent tooling, fixtures and excess material. * Personal toolboxes vs. Shadow Boards/Drawers | | | | * Links to calibration and operator TPM checks. * Frequency of 5S assessments * 5S results and actions are up to date * Red tag area is defined. * 5S areas of responsibility displayed * Work area cleaning disciplines (Sweep) regularity and owners * Clean Room controls are adhered to, audits conducted | |

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### DIAGNOSTIC 7: Set-Up Reduction

How the work area employs the techniques of Set-Up Reduction.

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| 0. Learner | | 1. Developer | 2. Performer | 3. Contender | | 4. Benchmark |
| No / or anecdotal evidence exists of SUR activities | | A plan exists to establish key processes which require SUR  Set-up recorded on job card / work instruction but no record of actual time taken | A Task team has been created to analyse set up times and prepare an action plan for SUR  Key processes are being identified for SUR activity  Target and actual set-up times are recorded but no review is undertaken for improvement | Task team in place to analyse set up times and follow through on actions for SUR  Key processes have been targeted for SUR activity, operators are being involved  SUR activity is driven by plans to reduce inventory and batch sizes  Target and actual set-up times are displayed, evidence of review and set up time is progressively reducing | | Detailed analysis of set up elements and evidence of continual improvement (internal to external)  Key processes have addressed SUR activity, operators are involved  SUR activity links to inventory and batch size reductions  Target and actual set-up time is displayed and analysed  Regular reviews are conducted to identify further improvements |
| Look  For: | * Set-up time on job cards and actual time recorded * Understanding of Internal and External set up * SUR training documentation * Video recordings of set-ups * 5S practice in place – shadow boards, color coding | | | | * Availability of tools, materials, instructions * Facilities / operations with long set-up times * Bottlenecks * Standard Set-up Times (Family of Parts/Tools) * SMED practices | |

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### DIAGNOSTIC 8: Standardised Job

How the work area develops capable and repeatable processes.

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| 0. Learner | | 1. Developer | 2. Performer | 3. Contender | | 4. Benchmark |
| Insufficient detail to allow standard method of working for most processes / operations  Significant variations  No review cycle in operation | | Plans exist to address method and time definition and accuracy  Evidence of review cycle in the plan  Standard time documented on job card / work instruction (perhaps not measured) | Standards defined at appropriate level of detail for some processes / operations  Standard job ‘developing’ - deviations in actual versus standard time  Some evidence of analysis or occasional review of standards but no formal review | Standards defined at appropriate level of detail for most processes / operations  All team/cell members understand the standards  Standard job ‘performing’ - minor deviations in actual versus standard time, deviations are analysed  Subject to review and updated to reflect improved methods | | Method and Time Standards defined - A formalised method and time study has documented procedures, tasks and times relating to Manpower, Machines, Equipment and Materials  All work area members understand and have contributed to the standards  Standard job ‘benchmark’ - insignificant deviation in actual versus standard time, any deviations are analysed  Subject to review and updated to reflect improved methods |
| Look  For: | * Method and time study conducted * Involvement of work area members * Actual and Standard time recorded * Standard time variances are analysed * Links to SPC data – Cpk is known * Links to FMEA | | | | * Job card amendments to reflect improved method * Use of diagrammatic aids, photographs * Use of "Haynes" manual step by step approach * Frequency that method and time are reviewed * Improvement plans | |

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### DIAGNOSTIC 9: 7 Quality Tools

How the work area utilises 7 Quality Tools for problem identification/analysis and improvement.

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| 0. Learner | | 1. Developer | 2. Performer | 3. Contender | | 4. Benchmark |
| No / anecdotal evidence of use of the 7 Quality Tools | | Some evidence of 7 Quality Tools use by work area members but information comes mainly from QA department  Plans exist to introduce the 7 Quality Tools | Some people in the work area team trained in use of Quality Tools  7 Quality Tools training/examples held on local network drives, but not accessible by all  Some evidence of 7 Quality Tools use by cell members but information comes mainly from QA or other departments | Most work area team members are trained in use of 7 Quality Tools  7 Quality Tools training/examples held on local network, accessible by all  Process, test and inspection data is collected and stored for easy access and interrogation  Evidence that the 7 Quality Tools are used by cell members | | All work area team members are trained in use of the 7 Quality Tools  7 Quality Tools Pocket Guides are used for reference and training/examples held on local network, accessible by all  Clear evidence that problems are identified, analysed and improvements generated  Process, test and inspection data is collected and stored for easy access and interrogation  Evidence that many of the 7 Quality Tools are used by work area members |
| Look  For: | * 7 Quality Tools: SPC Applications, Pareto Analysis, Cause & Effect Analysis, Process Mapping, Check sheets, Histograms, Run / Correlation Diagrams * Evidence of team meetings * Pocket Guides, training material and templates available | | | | * Communications of findings * Improvement plans * Local Champion * Use of Brainstorming Techniques | |

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### DIAGNOSTIC 10: Statistical Process Control

How the work area employs Statistical Process Control.

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| 0. Learner | | 1. Developer | 2. Performer | 3. Contender | | 4. Benchmark |
| No evidence of SPC being used within the work area | | Control Charts being introduced within the cell, key processes have been identified  Basics of SPC understood | Some processes have been assessed for SPC applicability  Plans exist to develop SPC further  Control charts in use within work area and control limits calculated for some key processes  Some SPC training has been conducted, analysis and action tends to be by Engineering department | Most processes have been assessed for SPC applicability  Operators trained in collection and analysis of SPC data, good understanding of SPC principles  Key processes in control CPK’s of 1.33 / Sigma Leve (Z Bench) of 4 being achieved  Operators taking action on out of control conditions | | All processes have been assessed for SPC applicability  Operators are trained in collection and analysis of SPC data, there is a thorough understanding of SPC principles  Control Plans / Control Limit History Records exist for key processes, CPK's of 1.66/ Sigma Leve (Z Bench) of 5 being achieved  Operators taking action on out of control conditions, group problem solving techniques being used |
| Look  For: | * Evidence of applications within the work area * Control charts displayed * Background information (e.g. Control Plans, Charts, Logs) * Links to Problem Solving Tools * Are the processes in Control * Action taken to bring under control | | | | * Has training been provided to all in the work area * Pocket guides, training material available * Is SPC terminology understood (e.g. In-Control / Capable / Centered) * Automated data collection * CPK score history / analysis | |

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### DIAGNOSTIC 11: Overall Equipment Effectiveness (OEE)

How the work area ensures equipment is always available and working correctly.

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| 0. Learner | | 1. Developer | 2. Performer | 3. Contender | | 4. Benchmark |
| Overall Equipment Effectiveness has not been considered | | Elements of OEE are being measured  Equipment has been identified for OEE  A plan is being prepared to develop OEE within the cell | Some equipment have OEE measures with targets set (perhaps not displayed but held on local computer)  Elements of OEE (availability, performance rate, quality) are being measured and improvements identified  Team have some understanding of OEE  OEE training planned | Most key equipment have OEE measures which are displayed showing current performance  The measure is benchmarked against industry average of 60%  Most team members understand OEE principles and take action to improve performance  Subject to review, historical records exist | | All key equipment have OEE measures displayed showing current performance  The measure is higher than industry average of 60% and approaching best in class of 85%  All Team members understand OEE principles and take ownership and action on any deviation in performance  Historical evidence of actions and achievements are available  OEE data collection is automated  Subject to regular review to maintain performance and identify improvements |
| Look  For: | * OEE measure calculated as Availability x Performance rate x Quality * Breakdowns * Changeovers & Set up adjustments * Team understanding * Improvement plans | | | | * Benchmarking / target setting * 5S & TPM (Total Productive Maintenance) * Links to value stream mapping * Equipment Return on Investment * Plant/equipment utilisation measures * OEE loss categories analysed | |

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### DIAGNOSTIC 12: Productivity Improvement

How the work area improves product/service quality and output per worker.

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| 0. Learner | | 1. Developer | 2. Performer | 3. Contender | | 4. Benchmark |
| No productivity improvement activities | | Activities to address people productivity and/or defect reduction have started | Some Waste removal and defect reduction activities are active, actions noted  The automation of NVA manual processes is being considered  Plans to measure defects per unit  Target and actual productivity levels are being developed  Team understanding | All work area members have been trained in the tools and techniques to recognise and eliminate Waste  Waste removal and defect reduction activities are active and displayed, actions noted  Plans exist to automate NVA manual processes  Defects per unit are measured & displayed  Target and actual productivity levels exist (not displayed)  Team understanding | | All work area members have been trained in the tools and techniques to identify and eliminate Waste  Waste removal and defect reduction activities are active and displayed, SMART actions noted  Non-value added manual processes have been automated  Subject to review, historical records exist  Defects per unit are measured, improving, displayed and at or better than target level  Target and actual productivity levels are displayed  Team understanding |
| Look  For: | * Work improvement activities to change work rules and redistribute work * Facility improvement activities to introduce automation * Standard time is allocated for each operation * Actual time is recorded for each operation | | | | * Standard time versus actual time is analysed for any variance – work area members are involved * Standard time is continually improved * Methodologies used to eliminate defects * Defect recording and analysis * Kaizen activities | |

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### DIAGNOSTIC 13: 7 Wastes - Processing

How the work area optimises processing/manufacturing time.

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| 0. Learner | | 1. Developer | 2. Performer | 3. Contender | | 4. Benchmark |
| Processing waste frequently observed - non-value added operations, inappropriate equipment used, over size material, ineffective training and work instructions  Process or general waste clearly evident | | Process flow charts are being prepared or exist but are not used  Process or general waste evident  Improvement plans being developed | Process operations are documented  Plans exist, at managerial level, to improve process efficiency  Action in hand to reduce non value added operations  Some process waste  Customer requirements understood and specified to some degree | Process operations have been optimised and documented, VSMs are being prepared  Team involvement / ownership of plans to improve processing efficiency  Non value added operations are being minimised Equipment design is appropriate  The lead time for each product is known and displayed Minimum levels of process waste  Customer requirements understood and fully specified | | Value stream mapping is used routinely to identify opportunities for improvement in processing time  Process efficiency (value added time ÷ total lead time) is improving, targets are set  Process operations are optimised, documented and reviewed  Non value added operations are minimised  Equipment design is appropriate and effective  The lead time for each product/service is known and displayed Minimum levels of process waste  Customer requirements fully specified and processing matched to prevent over-processing |
| Look  For: | * Facilities / equipment – appropriate to the process * Workplace ergonomics - U shaped production line * Tests and inspections are reducing * VSM or Process flow charts displayed * Process operations numbered and defined * Excessive materials and WIP | | | | * Flow of work follows a set route * Effective work instructions * Appropriate training * Optimisation software used * Appropriate use of jigs and fixtures – reviewed and improved | |

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### DIAGNOSTIC 14: 7 Wastes - Movement

How the work area reduces/eliminates nonvalue-added movement of personnel.

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| 0. Learner | | 1. Developer | 2. Performer | 3. Contender | | 4. Benchmark |
| Excessive time spent looking for tools, jigs, collecting materials or next job  Little apparent consideration given to workplace ergonomics | | Wasted movement observed  Operations are not in same area  Operator collects next job, materials etc.  No awareness of rules of movement economy | Wasted movement observed  Operations are not close coupled  Some line side deliveries of materials, tools, etc.  Scope for improvement in workplace ergonomics  Some awareness of rules of movement economy, improvement plans exist at managerial level | Operators are working effectively, minimal bending, stretching, walking, lifting or reaching  Mechanism in place for providing operators with next job, jigs and fixtures, materials, specifications, instructions  Some movement "off" or "around" the job  Scope for improvement in workplace ergonomics  Rules of movement economy understood but not fully deployed, infrequent reviews | | Operators are working effectively - no unnecessary bending, stretching, walking, lifting or reaching  Mechanism in place for providing operators with next job, jigs and fixtures, materials, specifications, instructions  Minimum movement "off" or "around" the job  Workplace ergonomics considered best practice  Rules of movement economy understood by all in cell and is regularly reviewed |
| Look  For: | * Close coupled plant and equipment * Distance between operations * Product flow paths – workplace ergonomics, 5S * ‘Double handling’ of material or WIP | | | | * Mechanism for providing next job * All relevant documentation issued with job * Use of spaghetti diagrams * Wasted floor space | |

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### DIAGNOSTIC 15: 7 Wastes - Transportation

How the work area reduces/eliminates non value-added transportation activities of Product.

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| 0. Learner | | 1. Developer | 2. Performer | 3. Contender | | 4. Benchmark |
| Excessive movement and handling required  No evidence of a planned product flow (separate buildings or isolated operation areas)  Transportation media for product is inappropriate and offers little protection from damage | | Transportation wastes understood and identified  Plans being developed to reduce transportation needs (e.g. a cellular manufacturing layout). | Transportation waste observed, some disruption to product flow due to cell layout  A plan is in place to reduce transportation of product (progress might not be recorded)  Some scope for improvement in transportation media | Some transportation waste observed  Scope for further improvement of layout to improve product flow or close coupling of operations  Transportation media (trolleys, boxes, packaging) is designed to protect the product from damage  Some inter-operation storage  Opportunities captured and addressed in an improvement plan | | Minimum distances required to transport product, tooling, materials, etc.  Facilities arranged to achieve uni-directional product flow  Close coupling of operations – work/test benches, plant and equipment  Transportation media (trolleys, boxes, packaging) is designed to fully protect the product from damage  Minimum inter-operation storage |
| Look  For: | * Product flow (Walk the Process) * Workplace ergonomics, 5S * Distances between operations * Close coupled benches, plant and equipment * Transportation media designed for the product / material | | | | * Double handling of material or WIP * Improvement plans * Inter-operation storage * Use of spaghetti diagrams | |

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### DIAGNOSTIC 16: 7 Wastes - Defects

How the work area ensures quality at source.

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| 0. Learner | | 1. Developer | 2. Performer | 3. Contender | | 4. Benchmark |
| Anecdotal or no evidence of mistake proofing or defect prevention  Downstream inspection employed, e.g. final inspection, no self-inspection | | Mistake proofing understood and opportunities identified within key processes  Some self-inspection, but mainly downstream inspection | Some prevention based detection mechanisms employed, Management plans to deploy further  Plans exist to implement operator self-inspection for the majority of jobs / processes  Defect root cause and corrective action analysis being used to determine level of in-process checks & inspections | Majority of key processes have appropriate prevention based detection mechanisms employed  Self-inspection employed for majority of jobs / processes  Defect root cause and corrective action analysis used to determine effectiveness of in-process checks and inspections | | Appropriate prevention based detection mechanisms employed in key processes, e.g. in-process checks to capture errors at source, use of mistake proofing techniques  Self-inspection employed for all jobs / processes  Defect root cause and corrective action analysis used to verify and update in-process checks and self-inspection |
| Look  For: | * ‘Critical to Quality’ checks * In-process tests and inspections on job cards * Analysis and feedback of root cause and corrective actions * Use of check sheets * MSA – Measurement Systems Analysis | | | | * Operator self-inspection on skills matrix * Location and size of final inspection department * Use of mistake proofing techniques (Poka Yoke) * Use of statistical techniques * Links to FMEA | |

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### DIAGNOSTIC 17: 7 Wastes - Waiting Time

How the work area ensures waiting time is minimised/optimised.

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| 0. Learner | | 1. Developer | 2. Performer | 3. Contender | | 4. Benchmark |
| Excessive waiting time, waiting for – people, parts, equipment, material and/or response from management | | Waiting time noted for people and/or product Bottlenecks have been identified  Plans being developed to reduce waiting time | Waiting time noted - people and product  Bottlenecks are being addressed  Waiting time measured (perhaps no action being taken)  Plans exist, at managerial level, to reduce waiting time | Operators are working effectively  Some waiting time observed, people and/or product  Some delay in starting next operation  Bottlenecks are being addressed  Mechanism in place for scheduling next job  OEE being developed  Waiting time measured and reducing  Plans in place to reduce waiting time | | Operators are working effectively and adding value  Product moves to the next operation with minimum of delay  No process or equipment bottlenecks  Mechanism in place for scheduling next job to line-side  Overall Equipment Effectiveness measured  Any waiting time is measured and analysed (through variance reports on 'shop floor/work data collection' system) |
| Look  For: | * Queue times at shared facilities (test, inspection, conformal coating) * Bottleneck processes * Unbalanced work load between operations * Poorly maintained equipment, lack of TPM * Waiting time measured and analysed for resource allocation | | | | * Skills matrices - skills aligned to demand * Excessive Inventory - material, WIP or finished goods * Material shortages * Operators are empowered to make decisions * Travel distances | |

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### DIAGNOSTIC 18: 7 Wastes - Inventory

How the work area is addressing the issue of batch size and inventory reduction.

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| 0. Learner | | 1. Developer | 2. Performer | 3. Contender | | 4. Benchmark |
| Excessive waiting time, waiting for – people, parts, equipment, material and/or response from management | | Batch sizing / classification understood, not yet defined  Product batch size/inventory reduction plan being developed  Kanban methods being considered. | Plan exists to change batch sizes to reflect A,B,C methodology  A,B,C logic defined  Inventory reduction plan deployed  Some deployment of Kanban methods | Minimum / planned inventory in work or as stock  A,B,C logic defined  Topical plan in progress addressing batch size methodology in line with A,B,C approach  Plan in hand to align batch sizes delivered by Suppliers to work usage (daily, weekly)  Significant gains recorded against inventory reduction plan  Significant deployment of Kanban methods e.g. direct line feed, two bin, max/min levels | | Products are produced in pre-defined batch sizes (A,B,C categorisation, logic defined)  Only planned material and WIP in work area and planned finished goods/products held as stock  Agreed batch sizes delivered by Suppliers - aligned to work area usage (daily, weekly)  Inventory management process optimised to maintain gains  Customer and supplier Kanban agreements in place |
| Look  For: | * Excessive WIP and material on shelves, in lay-by stores or on floor * Amount of product in finished goods store or as stock * Use of Kanban mechanisms (e.g. 2 Bin, Min/Max, DLF) * Visual display of Inventory in work area * EBQ / EOQ methodology * Batch sizes delivered by supplier | | | | * Supplier Delivery Agreements * Vendor Managed Inventory * Communication of customer schedule * Number of different products in work area * One piece production * A,B,C categorisation by value/item count: typically A class = 70%/10%, B class = 25%/30%, C class = 5%/60% | |

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### DIAGNOSTIC 19: 7 Wastes - Overproduction

How the work area matches supply with customer demand.

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| 0. Learner | | 1. Developer | 2. Performer | 3. Contender | | 4. Benchmark |
| Excessive products are produced to cover for scrap/wastage, future requirements, and a "just in case” philosophy adopted | | Waste due to overproduction understood, and identified  Improvement plans being developed | Overproduction observed  Scrap/wastage allowances built into production plan  Some excess product in finished parts store and as WIP  Improvement plans exist at managerial level  Majority of production not synchronised with customer schedule | Some overproduction observed but generally in line with customer requirement and build rate  Scrap/wastage allowances built into production batches, but being gradually reduced  The external supply chain is being developed to be ‘Just in Time’  Internal supply synchronised and driven by MRP  Team involvement in improvement plans | | Product quantities per day, week or month are manufactured in accordance with customer schedule and build rate  Minimum / planned inventory in finished parts store  Customer / Company / Supplier interface, synchronised as ‘Just in Time’  Internal supply synchronised and driven by MRP  Zero scrap/wastage allowance |
| Look  For: | * Alignment of Customer order against actual production * Communication of Customer schedule/build rate * Products made in advance of requirements * Re-order mechanisms (customer & supplier) | | | | * Products in finished goods store * Redundant stock * Built in scrap/wastage allowances * EBQ / EOQ methodology | |

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### DIAGNOSTIC 20: Kanban

How the work area employs the techniques of Kanban.

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| 0. Learner | | 1. Developer | 2. Performer | 3. Contender | | 4. Benchmark |
| No / little use of Kanban mechanisms | | Benefits of Kanban understood, application being planned | Some use of Kanban techniques  Scope for further opportunities recognised, plan for additional deployment being prepared | Kanban applied to most areas within the supply chain (internal and external)  Customer and lower tier supplier agreements being prepared  Some use of mechanism on non-product inventories (e.g.. consumables)  Scope for further opportunities recognised, plan exists for additional deployment | | Supply and demand synchronised via use of appropriate Kanban techniques  Kanban applied to all areas within the supply chain (internal and external)  Customer and supplier agreements in place  Extensive use of Kanban techniques on non-product inventories (e.g. consumables)  All in work area trained in Kanban techniques |
| Look  For: | * Visible Kanban triggers (footprint, max/min, 2 bin, Kanban card, supermarket system) * Production & Non-production applications (e.g. fixings / fastenings, consumables) * Customer and Supplier agreements | | | | * Lead-time reduction * Re-order mechanisms * Training Material * Use of Vendor Managed Inventory | |

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## Diagnostic Scoring

The table below can be used to record the scores agreed by the Assessment Team during the consensus scoring discussion, these should be transferred into the Man Ex Scoring Workbook where the scoring will be automatically calculated.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Diagnostic** | **Cell 1** | **Cell 2** | **Cell 3** | **Cell 4** |
| 1 | Production / Service Planning |  |  |  |  |
| 2 | VC Delivery SA |  |  |  |  |
| 3 | VC Non-conformance |  |  |  |  |
| 4 | VC Improvement |  |  |  |  |
| 5 | VC Skills Matrices |  |  |  |  |
| 6 | 5S Workplace Organisation |  |  |  |  |
| 7 | Set-up Reduction |  |  |  |  |
| 8 | Standardised Job |  |  |  |  |
| 9 | 7 Quality Tools |  |  |  |  |
| 10 | SPC |  |  |  |  |
| 11 | OEE |  |  |  |  |
| 12 | Productivity Improvement |  |  |  |  |
| 13 | 7 Wastes Processing |  |  |  |  |
| 14 | 7 Wastes Movement |  |  |  |  |
| 15 | 7 Wastes Transportation |  |  |  |  |
| 16 | 7 Wastes Defects |  |  |  |  |
| 17 | 7 Wastes Waiting Time |  |  |  |  |
| 18 | 7 Wastes Inventory |  |  |  |  |
| 19 | 7 Wastes Overproduction |  |  |  |  |
| 20 | Kanban |  |  |  |  |

# Section 2 – Management Commitment

#### What is Management Commitment?

Management Commitment is focused on understanding the managerial processes which ‘enable’ Lean within an organisation and what ‘results’ are being achieved as a consequence.

Managers may be ‘committed’ to a Lean philosophy but this assessment tests the integrity of that commitment and its maturity by addressing:-

* the structure or soundness of the approach
* how well it is integrated in the business over time
* its deployment across all areas
* how the approach and deployment are reviewed for effectiveness
* what results are being achieved to demonstrate that effectiveness

This ensures that Lean implementation is embedded and forms part of the organisation’s CSIP.

The RADAR system is EFQM copyright. A copy of the **EFQM Excellence Model ISBN: 978-90-5236-670-8** should be given to or bought by participating companies.

## Management Commitment Enablers

### Approach

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sound** | | How does the organisation ensure it has a soundly based approach to implementing Lean? | | **Score** |
|  |
| Consider: | * Best Practice Lean approaches tailored to the organisation as necessary. * Links to company strategy / business plan * Approach has clear rationale * Recognised methodologies * Developed procedures | | * Approach focuses on stakeholder needs * Cross functional management commitment * Training programmes * Includes design improvement methodologies * Evidence of senior sponsor * Allocated budget | |

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| **Integrated** | | To what extent is Lean Operations an integral part of the business? | | **Score** |
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| Consider: | * Is the approach routinely applied (a normal and fundamental part of the business operation) * Approach supports policy & strategy * Approach is linked to other approaches as appropriate (cross – functional links) * Involvement of supply chain & customer | | * Link to business plan * Strategy aligned to company processes * Strategy aligned to company systems * Local ownership * Prevention based | |

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### Deployment

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| **Implemented** | | To what extent has the organisation implemented its approach to Lean? | | **Score** |
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| Consider: | * Has it been implemented rigorously and to its full potential to the areas which it is appropriate * Has it been implemented equally to all levels of employees as appropriate | | * To all product and service areas as appropriate * Involvement of customers & suppliers * Appropriate people involvement at all levels of the organisation. | |

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| **Structured** | | Has the execution been structured to enable flexibility and organisational agility? | | **Score** |
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| Consider: | * Project planning mechanisms (should be a planned series of events rather than a series of ad-hoc actions) * A recognised ‘system’ for deployment e.g. 5 steps to lean * Steering group or project implementation team * SMART objectives for senior management team | | * Criteria for prioritised deployment (Inc. selection of pilot areas) * Process for resolving interface issues * Communication strategy * Extensive personnel coverage (training / involvement | |

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### Assessment and Refinement

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| **Measurement** | | How does the organisation measure the effectiveness the approach and deployment of Lean? | | **Score** |
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| Consider: | * Measures used (operational, financial and stake holder perceptions) | | * Regular measurement / review process with the intention of enhancing the approach and deployment * Appropriate personnel involved | |

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| **Learning and Creativity** | | How is learning relating to Lean used to identify best practice and improvement opportunities? How is creativity used to generate new or changed approaches? | | **Score** |
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| Consider: | * Best Practice visits * Benchmarking * Educational programmes e.g. NVQ’s in Improvement Techniques * Kaizen workshops * Good practice guides / databases | | * Lean Seminars * Lean Master class * Customer / supplier inputs * Individual and group learning activities | |

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| **Improvement and Innovation** | | How is the output from measurement and learning and creativity activities analysed and used to identify, prioritise, plan & implement improvements? | | **Score** |
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| Consider: | * Prioritisation & analysis process e.g. cost versus benefit, high impact/low impact, etc. * Process for maintaining improvements * Subsequent improvements to the approach and deployment e.g.   + clearer vision and strategy   + better stakeholder engagement | | * + improved communications   + further operational & financial improvements   + improved stakeholder perceptions   + refined improvement plans   + Lean applied to ‘new’ areas such as office environments, finance department, etc.. | |

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## Management Commitment Results

### Relevance and Usability

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| **Scope and Relevance** | | The scope of results presented is appropriate to monitor the effectiveness of Lean operations. | | **Score** |
|  |
| Consider: | Results address relevant areas:   * Manufacturing * Non-manufacturing * Supply chain * Customers   Financial, operational and stakeholder perception measures:   * Inventory reductions * Stock turns * Cost reduction * Lead-time reduction | | * Productivity measures * Delivery performance * Quality performance * Increased floor space * Process capability improvements * Reduced Set up Times * Adherence to standard times * Employee involvement / satisfaction * Customer and supplier benefits | |

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| **Integrity** | Results are timely, reliable and accurate. | **Score** |
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| **Segmentation** | | Results are appropriately segmented/stratified. | | **Score** |
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| Consider: | * By Sub Groups: Who, What, When, Where? * Business groups | | * Products * Customers | |

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### Performance

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| **Trends** | | Trends are positive and/or there is sustained good performance. | **Score** |
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| Consider: | * Charts and graphs with long term trends (3-5 years or as appropriate) * Positive trends in all measures * Sustained high levels of performance | | |

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| **Targets** | | What progress has been made against targets? | | **Score** |
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| Consider: | * All measures should have a target * Appropriate internal targets versus achievements * Rationale for targets (appropriateness) | | * Stretched targets * Link to business plan * Management reviews conducted against targets. | |

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| **Comparisons** | | What comparisons are made with external organisations? | | **Score** |
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| Consider: | * Comparisons with industry performance * Comparisons with acknowledged best in class * Comparisons of other sites (if applicable) | |  | |

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| **Confidence** | | There is confidence that performance levels will be sustained into the future, based on established cause and effect relationships. | | **Score** |
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| Consider: | * Clear links to the Enablers. * Enabling effect is visible for % of results. * Evidence that performance will be sustained. | |  | |

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## Management Commitment RADAR Scoring Matrix - Enablers



## Management Commitment RADAR Scoring Matrix - Results

