Unit 43: Teamwork in a Continuous Improvement Environment

Unit code: T/600/0316

QCF Level 3: BTEC Nationals

Credit value: 10

Guided learning hours: 60

● Aim and purpose

This unit will give learners an understanding of teamwork and the techniques and procedures required to contribute to and lead an effective team. The unit then goes on to cover the tools and techniques needed to enable learners to select a process or part for improvement and apply continuous improvement techniques in a manufacturing environment.

● Unit introduction

Business leaders identify two critical factors that drive success in world-class organisations – constantly improving performance by becoming better, faster, cheaper and more effective, and involving all employees in identifying and resolving problems. Performance improvement can only be achieved by improving the processes within an organisation. Because processes are designed and operated by people, the only way to improve performance is through people.

Usually the people best placed to improve a process, to make it run better cheaper and faster, are those who operate it every day and really understand how it works. Effective continuous improvement therefore depends on the ability of managers to ensure that everyone becomes actively involved in improving performance, working effectively in teams to analyse processes, investigate problems and implement solutions.

Continuous improvement teams are powerful tools that an organisation can use to ensure that employees stay firmly focused on meeting customer needs and business goals. Teams that bring employees together to solve problems and make improvements are one of the best ways to increase product quality and productivity. Improved communication, mutual respect and shared responsibility for goal achievement are proven results from properly building and leading continuous improvement teams. Continuous improvement teams therefore require the skills needed to identify, select and solve problems properly and conduct meetings aimed at making improvements.

This unit will give learners an understanding of teamwork and the techniques and procedures required to contribute to and lead an effective team. The unit then goes on to cover the tools and techniques needed to enable learners to select a process or part for improvement and apply continuous improvement techniques in a manufacturing environment.

Learning outcomes

On completion of this unit a learner should:

1   Know the principles of teamwork

2   Know about team and leadership activities

3   Be able to select a work area/part family and a process/part for improvement

4   Be able to apply continuous improvement techniques.

Unit content

1 Know the principles of teamwork

Theories and philosophies: motivational theories (Maslow, McGregor, Mayo); quality gurus' philosophies (Ishikawa and quality circles, quality tools, Deming, plan-do-check-act (PDCA) cycle)

Understanding teams: roles and responsibilities eg to superiors, subordinates, the business, each other and other external work groups, internal team management, direct and indirect relationships, lines of authority; operations of a team eg definition of groups and teams, nature of teams, types of teams, purpose of teams, characteristics of an effective team, prerequisites for team success, team evolution (form, storm, norm, perform), reasons for team failure; advantages eg for individuals (such as motivation, pride, job satisfaction, external qualifications), for the organisation (such as improved results due to increases in quality and productivity, increase in skilled, qualified and well motivated employees); possible disadvantages of teams (eg conflict between team members, team members dominating group work and/or undermining management, larger groups can impede progress)

Working relationships: characteristics of a good team member eg respectful, tolerant, cooperative, compromising, persuasive, confident, encouraging; communication (such as between teams, individuals, peers and hierarchical), importance of sharing knowledge, information and performance measures with others in your team or in other work groups; types of working relationship problems with team colleagues or colleagues in other work groups eg causes of concern and disagreements with team colleagues or colleagues in other work groups, maintaining productive working relationships by own behaviour, dress and language (such as being polite, courteous, respectful, responding in a timely and positive way)

2 Know about team and leadership activities

Team activities: duties eg contribute to continuous improvement activities, team briefings, performance reviews, brainstorming activities, question and answer sessions, problem resolution sessions, individual and team appraisals; reading and contributing to team boards eg work area key performance indicators; using email or internal network systems to aid communication; keeping visual controls and displays updated

Leadership activities: planning eg identifying achievable business targets, action planning, setting team goals and objectives; setting up the team eg induction, deployment and monitoring of team members, determining and agreeing individual roles and responsibilities, prioritising team's workload to ensure targets are met effectively and efficiently; leadership duties eg monitoring the performance of the team against the goals and objectives, managing poor or ineffective performance, supporting and encouraging team members, creating a cohesive workforce through teambuilding approaches, coaching/mentoring, training needs analysis, development of a skills matrix, individual and team appraisals, consulting and communicating with management, subject specialists, peers and subordinates, managing tension and conflict, disciplinary and grievance procedures

3 Be able to select a work area/part family and a process/part for improvement

Work area/part family selection activity: identify and produce part families based on part shape, size, material or manufacturing processes; identify problems based on an area's performance against selected key performance indicators eg parts per million (PPM), right first time (RFT), overall equipment effectiveness (OEE), people productivity, stock turns, delivery schedule achievement, value added per person, floor space utilisation and product cost reduction; set quantifiable objectives and targets; agree health and safety measures for the work area eg target versus actual, 5S/C housekeeping scores, statistical process control

Process/part selection activity: within chosen area/product family focus on customer schedules (volume); identifying costs eg production costs of part, profit margin of each part as a percentage; identifying time eg manufacturing lead time, cycle time, takt time; identifying quality values eg scrap, percentage non-conformance; agreeing the use of production documentation for process/manufacturing routes eg bill of materials (BOM), production plans, route sheets, production schedules, operation cards, standard operating procedures

4 Be able to apply continuous improvement techniques

Applying problem solving techniques: structured approach to problem solving; data collection eg check sheets, statistical process control, key performance indicators; identify improvement opportunities eg reduced production costs, improved quality, improved safety, improved working practices, reduced lead times, reduction in waste; identifying and using the appropriate quality tools eg plan-do-check-act procedure (PDCA), process flow charts, check sheets, tally charts, bar charts, histograms, Pareto charts, scatter diagrams, Ishikawa diagrams, root cause paths, 5 whys, brainstorming, mind mapping, statistical process control; identifying the root cause of the problem; determination and selection of permanent corrective actions

Implementation of an improvement activity: implementation of the corrective actions; planning eg implementation, protection of the plan, contingency; process monitoring; outcomes eg timeline graphs, standard operating procedures (creating or updating), visual management to communicate the work of the kaizen activity to participants and others

Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
P1 describe the motivational theories and quality gurus' philosophies	**M1** explain how your own behaviour, dress or language affects your working relationships	**D1** explain the types of problems that can occur in working relationships and how they could be resolved.
P2 state the roles and responsibilities of teams and individuals when operating within teams	**M2** explain how teamwork can help organisations operate effectively.	
P3 describe the advantages and any disadvantages of working in teams		
P4 describe working relationships in teams		
P5 describe the activities undertaken by teams		
P6 describe the activities that should be undertaken by a team leader		
P7 carry out a work area/part family selection activity [IE1]		
P8 carry out a process/part selection activity [IE1]		
P9 apply problem solving techniques within a continuous improvement activity on a selected process/ part [IE1, CT1, SM2, SM3]		
P10 describe the procedure for implementing an improvement activity.		

PLTS: This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

Key	IE – independent enquirers	RL – reflective learners	SM – self-managers
	CT – creative thinkers	TW – team workers	EP – effective participators

Essential guidance for tutors

Delivery

Delivery of this unit could concentrate on a particular manufacturing sector and work area, eg automotive and assembly. However, a generic approach covering a range of sectors and work areas is more likely. Centres should determine their approach through an analysis of their learners' needs and in particular, through consideration of the range of industries that the centre is working with or preparing their learners for. Whichever approach is taken should enable learners to understand the principles of teamwork and contribute effectively to continuous improvement activities in most industrial settings.

The learning outcomes are logically ordered and could be delivered sequentially. In this way, learners will begin to recognise the range of tools, techniques and activities used by teams in a continuous improvement environment. It is recommended that a variety of delivery methods are used including group discussions, team and individual group activities, research, industrial visits, presentations and tutor-led learning. This approach will help to keep a more practical approach, rather than spending too much time on theory. For example, a short introduction to team activities – followed by an industrial visit for learners to see at first hand real examples of teamwork. Talks by guest speakers will also add currency and vocational focus. As learners are dependent on gathering sensitive information from commercial operations, tutors should ensure that contacts and appropriate briefings are made well in advance with co-operative companies.

A blend of learning materials should be used to help motivate learners and place the unit in context. These should include CD ROMs, internet research, specific study packs on lean manufacturing topics, worksheets, industrial case studies, videos/DVDs and textbooks for extended study where appropriate.

Note that the use of 'eg' in the content is to give an indication and illustration of the breadth and depth of the area or topic. As such, not all content that follows an 'eg' needs to be taught or assessed.

Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

Topic and suggested assignments/activities and/or assessment
Whole class teaching: • describe the three motivational theories and the quality gurus' philosophies   • describe the roles and responsibilities of team members and the functions and operation of a team   • explain the benefits and disadvantages of team working   • explain working relationships within a team and the characteristics of a good team and its members.   *Individual activity:*   • analyse the main principles of teamwork and examples of good and bad team working.
Prepare for and carry out **Assignment 1: Principles of Teamwork** (P1, P2, P3, P4, M1, M2, D1)
Whole class teaching: • describe the main duties of a team   • describe means of reading and contributing to team boards and keeping visual controls and displays updated   • describe the planning duties of a team leader and their involvement in setting up a team   • describe the leadership duties and responsibilities that a team leader once a team is working on a project.   *Small group activity:*   • using case studies investigate the activities of a team and the team leader.
Prepare for and carry out **Assignment 2: Team and Leadership Activities** (P5, P6)
Whole class teaching: • demonstrate how to identify and produce part families   • demonstrate how to use key performance indicators to identify problems in a work area   • describe how to set objectives and targets and agree health and safety measures for the work area   • demonstrate how to identify costs, time and quality values for a process or part.   *Practical activity:*   • analyse a work area and a process to identify problems and see if and where improvements can be made.
Prepare for and carry out **Assignment 3: Applying Continuous Improvement Techniques** (P7, P8, P9)
Whole class teaching: • describe how to take a structured approach to problem solving   • demonstrate data collection methods   • describe how to identify improvement opportunities   • demonstrate means of using appropriate quality tools   • describe and demonstrate how to identify the root cause of a problem and select means of correcting it   • describe and demonstrate how to implement an improvement strategy.   *Practical activity:*   • practise using problem solving techniques and implement an improvement activity.
Prepare for and carry out **Assignment 4: Improvement Procedures** (P10)

Assessment

Assessment evidence can be collected from learners' involvement in continuous improvement team activities in their workplace or through case studies, assignments and projects. This should enable learners to demonstrate knowledge and understanding of the principles of teamwork and business improvement in a manufacturing environment.

The criteria relating to learning outcome 1 can all be assessed through a single written assignment. This will require learners to describe the three theories on motivation and explain Ishikawa's and Deming's philosophies on quality circles, tools and the PDCA cycle (P1). For P2, they will be expected to state the roles and responsibilities of teams and individuals within teams and for P3 the advantages and any disadvantages of team working. P4 requires learners to describe the working relationships within a team. The assignment can be expanded with additional written tasks that provide learners with opportunities to satisfy M1, M2 and D1.

For P5 and P6, learners are required to describe the activities undertaken by teams and team leaders. Tutors could allocate different activities to individual learners or groups of learners and ask them to feed back to the class in the form of presentations. When this is the case it must be remembered that the presentation skills or poster design skills are not being assessed.

Ideally P7, P8 and P9 could be linked to a common product, process or problem. Learners are expected to carry out a work area/part family selection activity, a process/part selection activity and then apply problem solving techniques on the selected process/part. Evidence for these criteria could be provided from the learners' involvement in continuous improvement activities in the workplace or work placement. If assessed directly by the tutor, suitable evidence from these activities would be standard documentation and observation records completed by both the learner and tutor. If assessed during a placement, witness statements should be provided by a suitable representative and verified by the tutor. Where learners do not have access to this form of activity, simulation could be used.

For P10, learners are required to describe the procedure for implementing an improvement activity, which could be assessed through a short written report or oral questioning.

For M1, learners should be able to explain how their own behaviour, dress or language affects their working relationships. M2 requires learners to explain how the benefits of teamwork help individuals and organisations perform effectively. This again, could take the form of a written task.

To achieve D1, learners are required to explain the types of problems that can occur in working relationships and how they could be resolved. This can be linked to P4 and M1. The evidence for this criterion can be obtained via a written report or alternatively take the form of a pictorial presentation with notes (possibly using PowerPoint or OHPs) and an annotated poster.

Programme of suggested assignments

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, P2, P3, P4, M1, M2, D1	Principles of Teamwork	Learners have been asked to investigate methods of improving teamwork.	A written report.
P5, P6	Team and Leadership Activities	Learners have been given a small team to lead and need to brief them about their own role and the activities expected of the team.	A presentation or information poster.
P7, P8, P9	Applying Continuous Improvement Techniques	Learners need to carry out work area/part family selection and process/part selection activities and apply problem solving techniques within their work place.	Practical activities in the workplace evidenced through observation records, witness statements and learners' process logbook.
P10	Improvement Procedures	Learners need to tell a work colleague the procedure for implementing an improvement activity.	A written report or oral questioning.

Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC Engineering sector suite. This unit has particular links with the following unit titles in the Engineering suite:

Level 1	Level 2	Level 3
	Applying Continuous Improvement and Problem Solving Techniques	Production System Design
	Workplace Organisation and Standard Operating Procedures	Six Sigma Quality
		Quality and Business Improvement Techniques

This unit supports the Level 3 NVQ in Business Improvement Techniques, particularly:

- Unit 2: Contributing to Effective Team Working

- Unit 3: Leading Effective Teams

- Unit 5: Applying Continuous Improvement Techniques (Kaizen)

- Unit 7: Analysing and Selecting Parts for Improvements.

Essential resources

To deliver this unit centres will need to have an up-to-date reference library with computer-aided learning resources and appropriate journals. Learners should have access to a range of textbooks relating to human resource management preferably in engineering-based settings.

Employer engagement and vocational contexts

This unit should be delivered and assessed in a vocational context and ideally learners should be able to carry out the practical activities required for learning outcomes 1 and 2 in the workplace. Further information on employer engagement is available from the organisations listed below:

- Work Experience/Workplace learning frameworks – Centre for Education and Industry (CEI, University of Warwick) – www.warwick.ac.uk/wie/cei

- Learning and Skills Network – www.vocationallearning.org.uk

- Network for Science, Technology, Engineering and Maths Network Ambassadors Scheme – www.stemnet.org.uk

- National Education and Business Partnership Network – www.nebpn.org

- Local, regional Business links – www.businesslink.gov.uk

- Work-based learning guidance – www.aimhighersw.ac.uk/wbl.htm

Indicative reading for learners

Textbooks

Armstrong M – *A Handbook of Human Resource Management Practice* (Kogan-Page, 2006) ISBN 0749446315

Armstrong M – *Managing People: a Practical Guide* (Kogan Page, 1999) ISBN 0749426128

Armstrong M – *Performance Management* (Kogan Page, 2006) ISBN 0749445378

Smith D – *Developing People and Organisations* (Kogan-Page, 1998) ISBN 0749426802

Torrington D, Hall L and Taylor S – *Human Resource Management* (Prentice Hall, 2004) ISBN 0273687131

Journal

International Journal of Operations and Production Management

Magazines

Engineering Technology

Manufacturing Engineer

People Management

Videos

Companies such as Video Arts produce a variety of videos which may be useful in covering human resource management topics. Examples include:

- *Managing Problem People*
- *Where There's a Will*
- *Team Spirit?*
- *The Coach.*

Further details are available from:

Video Arts Ltd
6-7 Cross Street
London EC1 8UA

Telephone: 0845 601 2531
Website: www.videoarts.co.uk

Delivery of personal, learning and thinking skills

The table below identifies the opportunities for personal, learning and thinking skills (PLTS) that have been included within the pass assessment criteria of this unit.

Skill	When learners are ...
Independent enquirers	identifying questions to answer and problems to resolve when carrying out a work area/part family selection activity, a process/part selection activity and when applying problem solving techniques
Creative thinkers	generating ideas and exploring possible solutions when applying problem solving techniques
Self-managers	working towards goals when applying problem solving techniques, showing initiative and organising time and resources.

Although PLTS are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
Independent enquirers	analysing and evaluating information judging its relevance and value when researching the principles of team work
Team workers	collaborating with others when working in small groups to apply problem solving techniques.

Functional Skills – Level 2

Skill	When learners are ...
English	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	discussing team and leadership activities
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	investigating and researching principles of teamwork
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	describing the motivational theories and quality gurus' philosophies describing advantages and disadvantages of teamwork.