

Moderators' Report/
Principal Moderator Feedback

Summer 2016

Pearson Edexcel GCSE in
Manufacturing (5MN02)
Paper 2: Manufactured Products

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General Comments

The performance of centres in this examination was similar to that in the previous series.

Those centres whose candidates tended to achieve the higher mark ranges were characterised by;

- Selecting a product to be manufactured that had an appropriate degree of demand for their candidates.
- Providing their candidates with clear and detailed manufacturing specifications and production plans.
- Allocating an appropriate amount of time for all of the assessment criteria to be addressed by their candidates.
- Supporting their candidates' achievements with detailed and comprehensive observation records and / or photographic records.

Quality of Written Communications (QWC) is assessed in 1 out of the 8 criteria but was rarely referred to specifically by centre staff. Assessment of QWC considers students' abilities to:

1. Write legibly, with accurate use of spelling, grammar and punctuation in order to make the meaning clear.
2. Select and use a form and style of writing appropriate to purpose and complex subject matter.
3. Organise relevant information clearly and coherently, using specialist vocabulary when appropriate.

The maximum score for unit 5MN02 is 50, and this unit also carries 30% of the overall assessment weighting for the double award GCSE Manufacturing.

Administration

Centres submitted the required portfolios before the deadline. Portfolios were received in a variety of shapes and sizes, but the preferred method for submitting any written work is to provide word processed work on A4 paper, in portrait mode, and hold each candidates' portfolio together using a single treasury tag through the top left hand corner only.

Most centres made good use of photography to support their assessment decisions of learner work.

Assessment

Where witness testimonies were used, the most effective ones tended to say exactly what was observed. An example of a high quality testimony, for criterion a, is shown below.

The student took a very active part as a member of the production team. Through planning/discussion about strengths and weaknesses, it was agreed that the student should be responsible for the pattern lay and pinning the pattern prior to cutting and then pinning separate components together, (50 in total). The student was also responsible for being Health and Safety Officer.

The student was efficient with the pattern lay and using the cloth and pattern with the minimum waste. The student used quality checks and when creases were found repressed any parts that required it. The student ensured her personal targets were achieved. The student was part of a successful team which completed the batch of products to the required standards by the deadline.

The student contributed to the team by keeping the team supplied with components, materials and parts pinned correctly and then clearly batched and marked for the next operation. The student also adapted when fabric was slipping by taping down the pattern to ensure quality of cutting.

The student was confident in carrying out her role as Health and Safety Officer and ensured, with regular checks that she and others worked safely. She was responsible for the distribution of posters of warnings and H&S reminders. She was always the last to leave the room at breaks having done a round of checks.

These type of comments, when combined with the content of the candidates work, help the moderator follow and understand why a centre awards high marks. This in turn helps the moderator agree with the marks awarded by the assessor/ teacher.

Many of the criterion in this unit require assessor judgements, with supporting evidence, about the level of independence or support which was witnessed. The most effective centres provided a summary of assessment considerations within each portfolio inserted in front of each criterion.

The following comments relate to specific criterion.

Criterion (a) - working as part of an effective team.

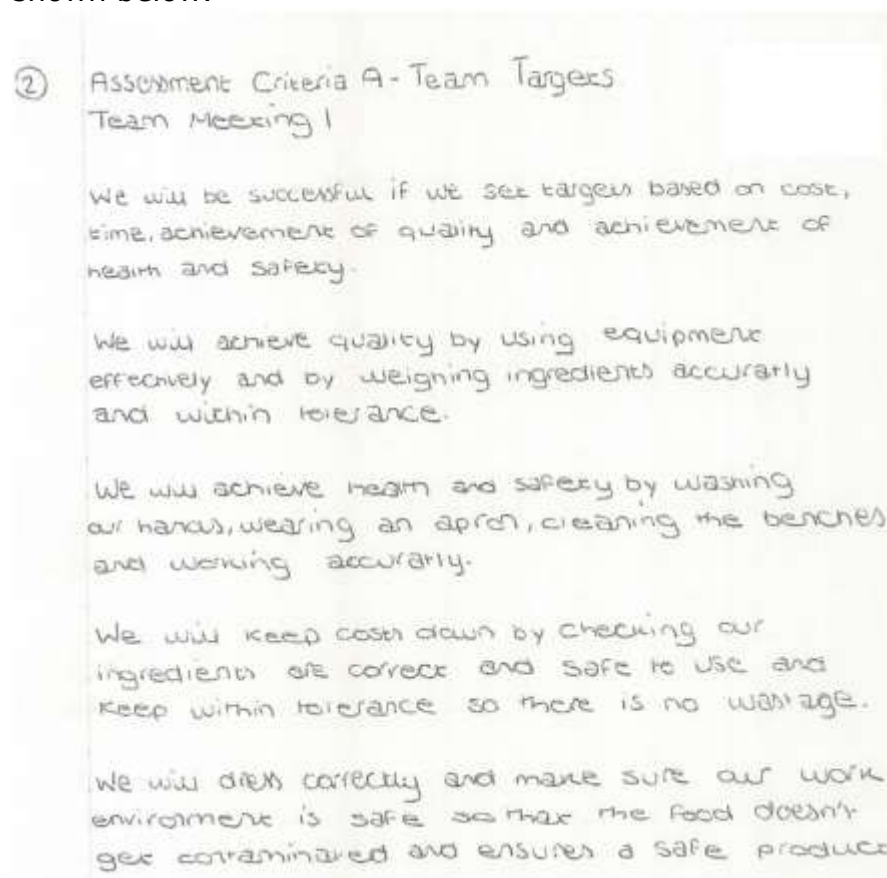
In order to complete this criterion candidates need to address two components;

- Evidence of the contribution they made to their team's outcomes
- Records indicating the extent to which both team and personal targets were achieved

As previously commented witness statements are essential for the first component of the assessment criterion, in which the assessor must record what each individual did within the team – whether they played a leading role, whether they helped to build an effective team, or whether they just contributed to an effective team. For each of these judgements details must be provided about how these were achieved.

A common format that successfully provided some of the evidence for the second component, were minutes of team meetings. In order for these to be useful, they need to contain specific targets for the team and individuals to achieve. The use of regular meetings allows candidates to clearly record how far towards their targets they had progressed. The minutes also showed where problems with the intended plans arose and how they were adapted to overcome them.

An example of the type of minutes and target setting that proved effective are shown below.



Centres should note that where a single learner takes notes about agreed targets and achievements etc. this evidence should not then be credited to all members of the team. Either each learner should take responsibility for maintaining their own records of their personal performance, and/or each learner should record a different, identifiable, aspect of the team performance.

Criterion (b) - produce a schedule for manufacture

In order to complete this criterion candidates need to address two components;

- Details of how their individually assigned parts of the product will be manufactured
- A schedule for the manufacturing tasks being undertaken by their team

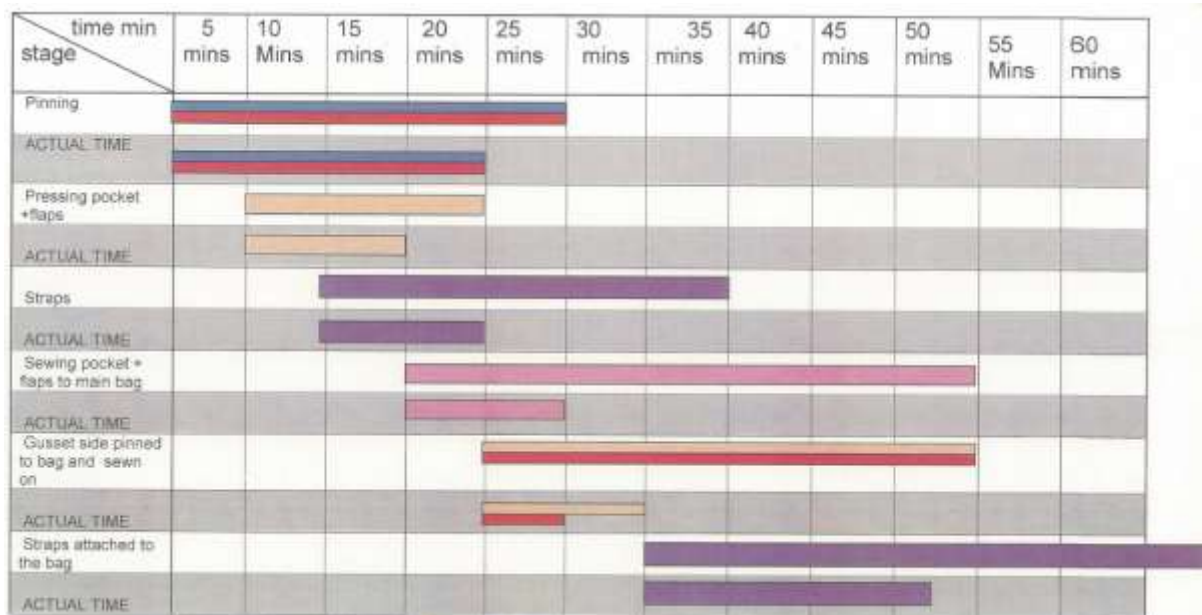
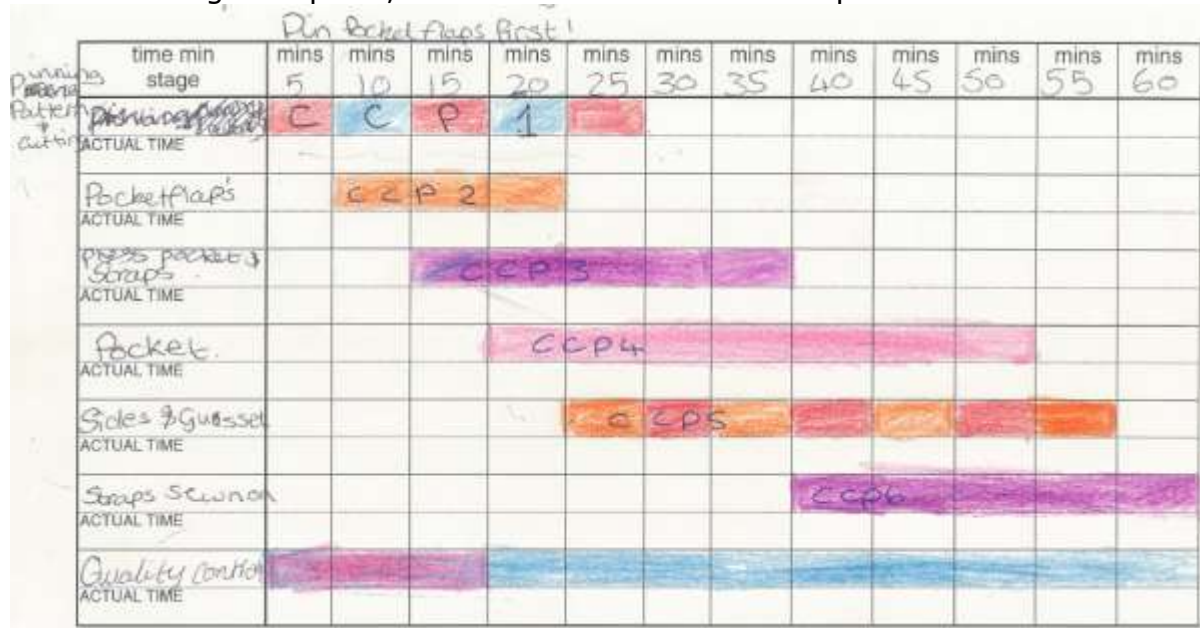
The first component of this criterion was most successfully addressed when candidates produced plans for production that included all preparation and assembly stages, health and safety, PPE, production and quality control procedures and consideration of how the product can be made most effectively. This should be based on the information provided by the centre at the outset of the assignment.

The second component of the criterion was successfully addressed using combinations of Gantt and flow charts. Gantt charts proved to be an effective method of displaying sequence and timing considerations. Flow charts were used to greatest effect when they were linked to quality control purposes.

It is important that individual contributions to the production of team documents can be traced by the moderator. A useful approach might be for candidates to first produce their own versions of a Gantt and / or flow chart. This could then be combined and refined by the complete team to produce a single improved version. This method would help clarify specific contributions each member of the team makes.

The materials produced for this criterion should become working documents for the candidates. By annotating the work with details of problems, or differences in times, as they occur the foundations for criterion h (modify production plan and schedule) will be formed. For example, the addition of a blank row below each stage in a Gantt chart would allow actual times to be recorded with minimal effort being expended by the candidates.

An example of this type of chart is shown below. The first version is before manufacturing took place, while the second is after the product had been made.



Criterion (c) - prepare and use materials

In order to complete this criterion candidates need to address two components;

- Evidence relating to the amount of support they required in order to prepare the materials and components needed to manufacture their products.
- Evidence of the working safely and applying skills.

Again, witness statements are essential to record the level of guidance provided as each candidate prepared relevant materials and components and the skill level with which they used tools safely.

Annotated photographs of the manufactured product were an effective method for candidates to demonstrate how they had worked skilfully. The evidence may be implicit, but a high quality final product would probably be dependent on the people making it skilfully. It is important that where candidates complete individual elements of the manufacture, the photographs clearly allow the moderator to see what they did. In this way, the performance of the whole team for this criterion is not determined by the least skilful individual member of the team.

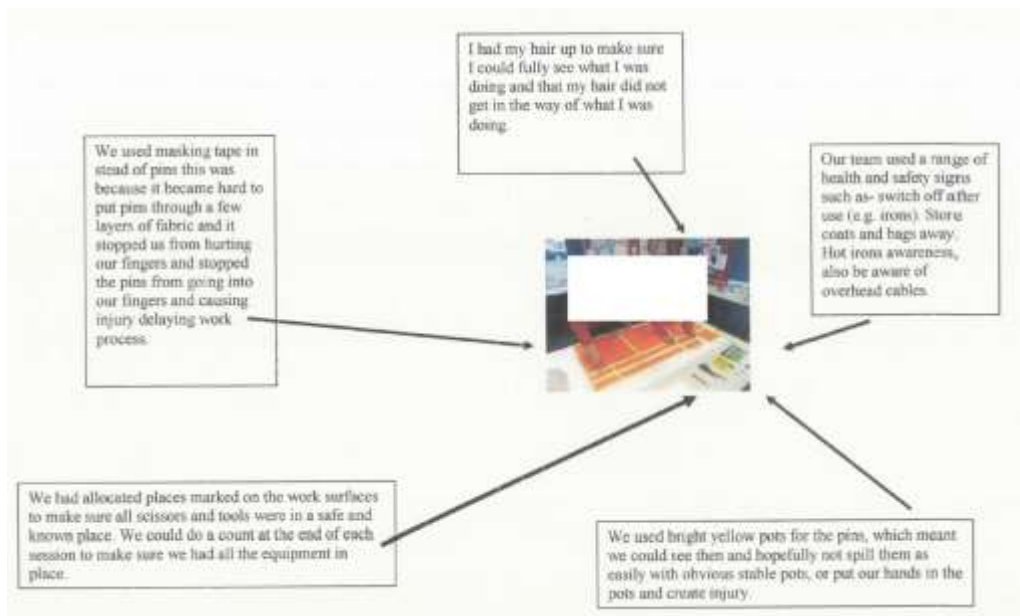
Criterion (d) - prepare and use tools, equipment and machinery

In order to complete this criterion candidates need to address two components;

- Evidence relating to the amount of support they required in order to prepare the tools materials and components needed to manufacture their products.
- Evidence of the working safely and applying skills while using processes and following procedures.

The comments made for criterion c apply in the same way to criterion d.

The photograph below is an example of one method to indicate safe working, which could be used for both criteria c and d.



Criterion (e) - manufacture products to meet requirements

In order to complete this criterion candidates need to address two components;

- Evidence of the safe manufacture of products to meet the clients' requirements.
- Evidence of the product conforming to quality standards.

To a large extent a candidates' ability to gain credit for second part of the criterion depends on the level of detail they are provided with in the client brief. If the clients' requirements and quality standards are not clearly defined then a candidate will not be able to address them.

In order to gain marks from the higher ranges, there is an expectation that several kinds of evidence will be provided. A witness statement should be used to confirm that products were made to the appropriate standard. This should be supported with evidence of the candidate themselves checking the quality the outcomes, typically annotated photographs were successfully used to provide this.

Criterion (f) - monitor production

In order to complete this criterion candidates need to address two components;

- Evidence of the comparisons between the expected time to manufacture the product and the actual times taken.
- Comments that consider why there were differences between the two sets of times.

Those centres whose candidates accessed the higher mark ranges were characterised by including space to record actual timings within the materials produced for criterion b. These actual timings were collected during the manufacturing processes.

Centres, and hence their candidates, should be aware that it is highly likely that the original plans with their estimated times will not be accurate. There is no penalty for finding something wrong within the original planning, but there are marks to be gained for detecting it and suggesting and making improvements 'in order to maintain production'.

Criterion (g) - use quality control techniques

In order to complete this criterion candidates need to address two components;

- Evidence of the candidate objectively monitoring the quality of the artefacts produced.
- Evidence of consideration of possible reasons, and potential solutions, for artefacts failing to conform with to the required standard.

Learners should be encouraged to record specific details of the results of quality control tests, not simply if the item being considered passed or failed. For example two versions of quality control test records are shown below for a component with required length of 25mm +/- 0.5mm. The version on the right hand side conveys more useful information than the one on the left.

Component	Length 25 +/- .5
1	Pass
2	Pass
3	Pass
4	Fail

Component	Length 25 +/- .5	Decision
1	25.1	Pass
2	25.3	Pass
3	25.5	Pass
4	25.7	Fail

The results of the testing should also be accompanied by photographic evidence of the tests being performed.

Criterion (h) - modify production plan and schedule for manufacture

In order to complete this criterion candidates need to address two components;

- Using data collected during the manufacturing process to improve the production plan
- Using data collected during the manufacturing process to improve schedule for manufacture.

To a large extent a candidates' performance in this criterion is closely linked to those that have preceded it. Typically, it was observed that candidates performing in lower mark ranges for the early criteria were subsequently unable to access the higher mark ranges for this criterion.

Conclusion

The importance of the information candidates are given at the start of this assignment, must be given due consideration by centres. Where candidates are not provided with an appropriate level of detail in the client brief and specification access to the higher mark ranges, in multiple criteria, will not be possible for even the most able of candidate. When structuring assignments for candidates, centre staff might consider working from the end of the assessment criteria towards the beginning. That way they could consider "if my candidates need to show they can do this here I need to give them this information here".

Example of possible content for a high grade project

Criterion	Typical content
A - Teamwork	Typically learners will provide evidence of assessing the strengths of their team members and allocating roles based on these. Witness testimony will support a leading role being played. There will be a specific witness statements indicating that individual and team targets were achieved. These will be

	accompanied by a learner review of how both their personal and team targets and as well as their achievements.
B – Schedule	A detailed schedule will be produced, that provides sufficient information for a suitably qualified third party or parties to manufacture the required batch of products. There will be a specific witness statement indicating the learner worked independently to succeed.
C – Prepare and use materials	There will be explicit evidence, probably in the form of photographs and notes, showing the learners preparing materials and components in order to meet the outcome. There will be a specific witness statement indicating that the learner worked independently and that safe working and good levels of skill were demonstrated.
D - Prepare and use tools	There will be explicit evidence, possibly in the form of photographs and notes, showing that learners prepared tools and equipment in order to meet the outcome. There will be a specific witness statement indicating no support was required by the learner to succeed and that safe working and good levels of skill were demonstrated.
E – Manufacture products	There will be photographic evidence and notes confirming that the manufactured products meet most of the demands of the client brief. There will be objective testing recorded showing that the products comply with most specific quality standards.
F – Monitor production	There will be direct comparisons between planned and actual production processes and timings. The learner will provide specific comments that justify where and why differences between planned and actual occurred.
G – Use of quality control	The learner will make valid comments about several measureable quality aspects of their products. There will be descriptions of problems that occurred and potential problems that could have occurred.
H - Review	The learner will use the experience of the manufacturing process to suggest ways in which production processes could be significantly improved. There will be amendments to the schedule, with the reasons behind the change given.