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Moderators' Report/ Principal Moderator Feedback

Summer 2013

GCSE Manufacturing

5MN02 Paper 01

Manufactured Products

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Summer 2013
Publications Code UG036327

Unit 5MN02_01
Manufactured Products

General Comments

The performance of centres in this examination series covered the full range of assessment possibilities. During the moderation process a variety of approaches to delivering the unit were observed.

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

- Selecting an intended manufacturing outcome that had an appropriate degree of demand for their students.
- Providing their students 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 students.
- Supporting their students achievements with detailed and comprehensive observation records and / or photographic records.

In contrast to the above, in some instances the following situations were observed;

- Students being required to produce artefacts that did not require them to demonstrate an appropriate level of skill for a key stage 4 student.
- Students being allocated time, and given credit for, developing their own product design specification.
- Students being provided with design specifications that lacked appropriate quality indicators, such as tolerances.
- Students being provided with production plans that lacked the appropriate depth of information.
- Centre assessors awarding marks to ephemeral factors, such as contribution to teamwork, without supplying evidence to support the marks awarded.

Where centres demonstrated some of the second set of characteristics above it may have been that they failed to fully appreciate the information contained in Edexcel published resources, such as the Edexcel GCSE Manufacturing Controlled Assessment Teacher Support Book. The information below is repeated from these resources to illustrate the nature of the intended outcomes.

- In this unit there should not be any design activity by the students. The students are required to manufacture the products to the standards given by the product specification.
- Students must be given a written product specification and detailed production plan in order to generate a schedule for manufacturing the products.
- A good product specification will allow students to plan and produce manufacturing solutions against a measurable specification which contains quality assessment features and realistic and meaningful tolerances. A product specification that only includes sketches, drawings and aesthetics could limit students' ability to achieve some of the higher mark bands and some criteria could be difficult to achieve in full.

- Students must learn how to use a product specification and be able to recognise the following essential information: size, shape, form, materials, parts and components, process methods, quantity required, timescales.
- The production plan provides all the details required to make a product. Students must use these details in order to develop a schedule for the manufacture of a number of products. The details that need to be taken into account include:
  - materials, parts and components to be used,
  - processes to be used,
  - tools, equipment and machinery to be used,
  - the sequence of production, including critical production and quality control points,
  - production scheduling, including realistic deadlines,
  - how quality will be checked and inspected,
  - health and safety factors.

Quality of Written Communications (QWC) is assessed in 1 out of the 8 criteria but was rarely referred to specifically by centre assessors. 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

Most 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 student's portfolio together using a single treasury tag through the top left hand corner only.
Several centres make use of writing frames, but paper based ones can have serious limitations. The high achievers may have more to write than will fit into each box, causing their QWC marks to suffer, whereas the weaker students write using large letters to fill the boxes, even if they are saying little of relevance. A set of subheadings and a word processor proved to be more beneficial, where used.

There were some instances where the Controlled Assessment Tracking Sheet lacked an appropriate level of information, including reference to the page numbers that show where the evidence is located. When the moderator has to search through a portfolio to find where marks have been credited there is the potential for valid evidence being missed.

Several portfolios included pages which lacked page numbers or titles, which is unhelpful to the moderation process.

Some centres allowed students to include materials that were probably used for 'teaching' purposes in the evidence submitted for 'assessment'. Where work is not the result of students own activity, or not related to the assessment criteria consideration should be given to the merits of including it in the sample sent for moderation.

Many centres made good use of photography, which is to be encouraged together with the use of ICT. Word processing of portfolios, with import of images, provides the most effective results.

Assessment

Where witness testimonies were used, the most effective ones tended to say exactly what was observed.
Many of the criteria 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.

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

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

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

As previously observed, 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 on how this was 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 specific individuals to achieve. The use of regular meetings allow students 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.

The use of photographs, student logs with teacher comments added, etc all proved helpful in allowing the moderator to follow the assessment decisions that the centre assessor had made.

Some students included an evaluation of the performance of all members of the team, when only comments on their individual performance is needed. Centres, and hence students, should appreciate that there is little merit in including research about 'team theories' in their submissions.

Criterion (b) - produce a schedule for manufacture

In order to complete this criterion students 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 students 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 students 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 students. 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 students.

Criterion (c) - prepare and use materials

In order to complete this criterion students 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 student prepared relevant materials and components and the skill level with which they used tools, safely.
Again annotated photographs of the manufactured product were an effective method for students 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 students 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 students 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 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).
There was evidence that some centres organised sessions solely for purpose of photographing students apparently making their products. For example when a number of students are all shown working at the same bench, with hand tools all in the same position around the bench and waste materials in the same positions across multiple pictures the resulting photographs provided little evidence to support actual safe practice being demonstrated. If for logistical reasons photographs cannot be taken during the actual manufacture it would be appropriate to take them at a later stage but the centre should make it clear that this has happened, through notes or student annotation.

Criterion (e) - manufacture products to meet requirements

In order to complete this criterion students 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 student's ability to gain credit for this criteria depends on the level of detail they are provided with in the client brief. If the client's requirements and quality standards are not clearly defined then a student 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 student themselves checking the quality of the outcomes, typically annotated photographs were successfully used to provide this.
Some centres allowed students to submit evidence which included extensive risk assessments for multiple processes. Where these are generated by the centres and not the student themselves, they gain limited credit. The most effective method of evidencing safety was often annotated photographs of the student demonstrating safe working practices. This was often supported by notes written by the student during the planning stages.
The teacher guidance documents provides a more detailed expansion related to this criterion.

Criterion (f) - monitor production

In order to complete this criterion students 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.

This criteria appeared to be poorly understood by a number of centres. It was interpreted as mean quality control, which is criterion (g), rather than about monitoring the rate of production and timing of each element/activity.
Those centres whose students 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 students, 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 students need to address two components;

- Evidence of the student 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.

Some very thorough work was seen across the range of sectors and a range of products, including: inspecting the product or components manufactured at each stage of production, checking that ingredients were weighed accurately enough, needle tension was satisfactory, drills were sharp and cuts were neat and straight, dimensions were being worked to, within allowed tolerances, etc – everything, in fact, to make sure the products are of an acceptable standard. These tests were clearly evidenced both through witness testimony and photographs.
There were also some examples seen where there was insufficient evidence to confirm that procedures had actually been undertaken. For example a chart that simply records pass / fail for particular attributes of an artefact is unlikely to support the award of high marks unless the moderator can follow how the decisions were made. For example, photographs of the lengths of components being checked would help confirm the validity of the results.

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

In order to complete this criterion students 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 student's performance in this criterion is closely linked to those that have preceded it. Typically it was observed that students performing in lower mark ranges for the early criteria were subsequently unable to access the higher mark ranges for this criterion.

From the portfolios moderated, there was some indication that students modified their product and suggested changes to it or its design, instead of changing and re-drafting their schedule in the light of manufacturing activities and the quality data collected during manufacturing.

The importance of the information students are given at the start of this assignment must be given due consideration by centres. Where students 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 students.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:
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