

ENGINEERING MANUFACTURE

Moderators' report

INCLUDED ON THE
KS4 PERFORMANCE TABLES

OCR Level 1/Level 2

Cambridge National in Engineering Manufacture

J823

For first teaching in 2022 | Version 1

R015-R016 Summer 2025 series

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Introduction

Our Moderators' reports are produced to offer constructive feedback on centres' assessment of moderated work, based on what has been observed by the moderation team. These reports include a general commentary of accuracy of internal assessment judgements, identify good practice in relation to evidence collation and presentation, and comment on the quality of centre assessment decisions against individual Learning Objectives. The report also highlights areas where requirements have been misinterpreted and provides guidance to centre assessors on requirements for accessing higher mark bands. Where appropriate, the report will also signpost other sources of information that centre assessors will find helpful.

OCR completes moderation of centre-assessed work in order to quality assure the internal assessment judgements made by assessors within a centre. Where OCR cannot confirm the centre's marks, we may adjust them in order to align them to the national standard. Any adjustments to centre marks are detailed on the Moderation Adjustments report, which can be downloaded from Interchange when results are issued. Centres should also refer to their individual centre report provided after moderation has been completed. In combination, these centre-specific documents and this overall report should help to support centres' internal assessment and moderation practice for future series.

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If you have any queries, please contact our Customer Support Centre on 01223 553998 or email support@ocr.org.uk.

General overview

It is important for moderators to receive candidate work from centres by the deadline date. Delayed submission of samples slows down the moderation process, and the resolution of issues should they arise during moderation.

Centres should check carefully what sample work is being requested for moderation and make sure that the correct sample of candidates is sent to the moderator.

A completed Unit Recording Sheet (URS) is required for each candidate in the requested sample. Without a correctly completed URS for each candidate moderation cannot take place and will be delayed.

Please make sure that all candidates are correctly identified on their paperwork with the correct candidate number. This includes in the naming of electronic files, which should include the centre number, unit number and candidate number.

Clerical errors

Please carefully check the addition of marks on the URS and their transcription to Submit for Assessment. If they are incorrectly totalled or transcribed, we will need to reconfirm them with centres at moderation. This introduces delay to the moderation process.

A copy of the IMS1 mark sheet generated by Submit for Assessment is no longer required to be sent to your moderator and can be retained in centre.

Marker comments on the URS

Marker commentary on the URS, along with clear indication of how the mark given is derived, helps greatly with the moderation process. Page numbers of where evidence can be found in the candidate work is also extremely useful. Candidate work can also be directly annotated showing where each Task and mark band is being addressed.

Centres are reminded that work cannot be double counted, and if used as evidence for one task should not be used for others. This is also the case for work that overlaps more than one task or unit within the qualification. Work that is double counted might be discounted if found during moderation, thereby disadvantaging the candidate.

Internal standardisation

If more than one internal assessor is marking a cohort of work, it is crucial to standardise marking across those involved. Internal standardisation ensures that the marks presented are accurate and consistent and that the rank order of marks is maintained. Rank order errors are often referred to the centre by the moderator and often require the centre to remark work, thereby delaying the moderation process.

Photographic evidence should be annotated by the candidate to explain what is being presented. It should also clearly identify the candidate, for example, using a card with their candidate number.

Authentication

It is essential that candidate work is authentic. This means that it is individual, and that sources of information are referenced. This is not only good practice but avoids the risk of penalties being applied. Moderators check for authenticity during moderation, referring any suspected cases to OCR for further investigation. This will delay moderation and may have serious consequences for the centre and candidate. Copies of Candidate and Unit Authentication Statements are required to be completed and should be kept in centre in case they are requested. They do not need to be sent to the moderator and do not form part of the moderation process.

Centres must use the Teacher Observation Records (TORs) included with the Set Assessments to support and corroborate candidate-generated evidence where independence is part of the marking criteria. Where a TOR is not included, and the task requires the corroboration of independence then this should be noted on the URS. This qualification does not use 'Witness Statements' which were included with the legacy qualification, and so these should not be used here.

Teacher Observation Records (TORs)

TORs are used to support and corroborate evidence produced by candidates and are useful where this evidence is difficult to show directly. Examples include working independently, working safely, and producing high quality finished items. They cannot be used as a direct source of evidence when the candidate is able to produce evidence themselves. Moderation will impose penalties where a TOR is used incorrectly. TORs should be individualised for each candidate, and not all be identical.

Full guidance on how to use the TOR correctly can be found alongside the supplied TOR within each Set Assessment brief, with further guidance on the OCR website.

Unit R015 General overview

In this unit it was evident that candidates were able to plan for manufacturing of a one-off product using hand and manually controlled machining processes. Their evidence was sometimes let down by lack of step by step evidence of each stage of the marking out and performing hand and machine processes. There were quite a few cases where the final item (the slide hammer) was not shown.

Comments by task

Task 1 – Planning the manufacture

For this task, candidates are required to produce a production plan. Various styles of plan were presented including tables and flow charts. The more successful plans tended to be those that were tabulated, and which included: sequence number, description of operation, tools and materials required, health and safety considerations, timings, and QC checks. Plans need to include sufficient step by step detail to manufacture and assemble the product (i.e. the slide hammer).

There was sometimes evidence of candidates interpreting the features on the supplied drawing using suitable annotations to begin with – and although this is a sound approach to starting this Task in preparation for planning it is not strictly required and does not gain any credit.

Assessment for learning



Planning:

You could provide candidates with a blank planning template or table with appropriate headings for them to complete.

Task 2 – Risk assessment

For Task 2 candidates are required to undertake a risk assessment to identify any potential hazards and their associated risk and identify suitable control measures for manufacture of the slide hammer. This was generally well attempted. Centres can use the risk assessment template provided with the Set Assignment brief or use their own if desired (e.g. template from the Health and Safety Executive (HSE) website). It is also sound to provide some estimate of the level of risk involved with hazards, and how this can be reduced with the use of suitable control measures and the use of Personal Protective Equipment (PPE).

Assessment for learning



Risk assessments:

Candidates can use the supplied risk assessment template with the Set Assignment, or an alternative could be supplied by the centre for them to use.

Task 3 – Measuring and marking out

This task was generally well attempted with candidates being able to demonstrate the safe use of equipment to undertake marking out. Please encourage candidates to provide detailed step by step annotated photographs of this activity taking place, recording all key stages of the marking out process. This can be done using a series of annotated photos showing marking out being undertaken by the candidate. A card with the name and candidate number could be included in the photos. This task is also marked on the basis with which candidates worked independently to perform marking out. This can be done with a suitable teacher comment on the Unit Recording Sheet (URS).

It is recognised that marking out (Task 3), manual machining (Task 4) and use of tools/equipment (Task 5) might be attempted as a series of interleaved activities and recorded as a single photo diary which is acceptable. If this is the case, then it is useful to identify which task is being addressed in the evidence being presented.

Task 4 – Machining and Task 5 – Use tools and equipment

Task 4 and Task 5 require candidates to use manual machining processes and hand tools to produce a one-off product. Again, these tasks were generally well attempted, although sometimes let down by lack of step by step evidence.

Please make sure that candidates produce sufficient step by step annotated photographic evidence showing all key stages of manufacturing relevant to both Task 4 and Task 5. A photograph of the completed, assembled product (i.e. the slide hammer) should also be included. This was often not included with the evidence supplied. A card with the name and candidate number could be included in the photos.

Also please try and avoid the overuse of stock photos that do not actually show the candidate undertaking the manufacturing activities. Where it is not acceptable to show the candidate's face in the images, a card with the candidate number in the image will suffice. Alternatively, you could show their hands undertaking the activity.

The overuse of text in the annotations is also not required; the annotations should explain briefly the activity being demonstrated and do not need to provide analysis of what is being shown.

These tasks rely both on direct evidence from the candidate, and additional supporting evidence of independent working using a TOR. Evidence of independent working can be corroborated using the TOR supplied with the Set Assignment brief. Please remember that the purpose of the TOR is to support and corroborate candidate evidence; it is not a substitute for evidence that is presented by the candidate. There were instances again where a high mark had been given based on the TOR alone, with little or no candidate-generated evidence. This is not acceptable.

OCR support



Teacher Observation Records (TORs):

A blank TOR template along with full guidance on its use can be found for Task 4 and Task 5 in the Set Assessment brief.

It is important to remember that they cannot be used as a substitute for direct evidence that the candidate can produce. They should only be used to support and corroborate things like independent and safe working, or the quality of a finished product.

Unit R016 General overview

There was often sound evidence presented in this unit of candidates being able to plan for and perform activities related to scale manufacture using CNC machines. There was also evidence of undertaking quality control, although this was not convincingly attempted based on the evidence presented.

Comments by task

Task 1 – Manufacture templates

In Task 1 there was clear candidate evidence, in the form of annotated photos, of a suitable template being produced.

The template can be made using card or manufactured on a CNC machine. It is not a requirement to use both methods. The template does not necessarily need to be a copy of the item to be CNC manufactured – rather a production aid so could be used to just check some features of the manufactured component.

Please note that the intention of this task is to produce a template to be used later in the quality control activity in Task 5 to check the quality of the finished components.

There was some evidence of candidates using a disproportional amount of time for this activity in detriment to activities in the later Tasks.

You must make a note on the Unit Recording Sheet (URS) of any assistance that candidates required when producing their templates.

Task 2 – Produce a standard operating procedure

Most candidates were clearly able to produce a standard operating procedure (SOP) for this task which included sequence of operation, CNC operating parameters and health and safety considerations.

Some centres were little unsure of what a SOP should contain and could refer online for examples.

Alternatively, the SOP could be presented in tabulated form, considering stage number, task, method, quality control, safety measures and timing. The SOPs were often logical and very well detailed and included setup parameters for the CNC equipment. Risk Assessments could additionally be produced using the template supplied with the Set Assignment brief. It is also sound to provide some estimate of the level of risk involved with hazards, and how this is reduced with the use of suitable control measures and the use of Personal Protective Equipment (PPE).

Please remind students to reference any sources of information or data required as part of the SOP.

There were some instances of candidates who had produced a vast amount of information about different, alternative, types of CNC processes, the pros and cons of each, and had looked at different types of materials (e.g. for 3D printing). There was also evidence of excessive step by step instructions of how to use the CAD/CAM software to program the CNC machine. This level of detail is not required – the SOP should enable someone to safely manufacture the CNC-produced component and include health and safety considerations and setup and operating procedures and parameters for the specific CNC machine being used in centre.

Assessment for learning



Standard Operating Procedure (SOP):

Candidates could be provided with a blank SOP template or table with appropriate headings for them to complete.

Task 3 – Use CAD software

Candidates often demonstrated well the use of CAD software to set up the program for the CNC machine using a series of annotated screen shots. Perhaps the screen shots (or another alternative such as a short, embedded video) could show more clearly the onscreen simulation being performed (e.g. a toolpath simulation). This was sometimes a little difficult to follow in some of the evidence presented. Note that where software does not allow for an onscreen simulation that this can be evidenced with photos or videos of a practice run on the actual CNC machine.

Candidates are also required to show how the completed program is transferred to the CNC machine – which can be done with annotated photos or a short video.

This task previously required corroboration of how independently candidates had used CAD software – and this is no longer required.

Task 4 – Set up and operate CNC equipment

In Task 4 there could perhaps be better evidence of the safe setup and operation of the CNC machine using a series of annotated photos (e.g. a practical diary). This was not always presented by candidates. Photos of the finished product components and assembly were, however, evident in most cases.

The task was often correctly supported by the TOR in most cases. Please remember that the TOR can only be used to support and corroborate candidate evidence, which for this task could be in the format of annotated photos.

Please try and avoid the overuse of stock photos that do not actually show the candidate undertaking the setup and operation of the CNC machine. Where it is not acceptable to show the candidate's face in the images, a card with the candidate number in the image will suffice. Alternatively, you could show their hands undertaking the activity.

OCR support



Teacher Observation Records (TORs):

A blank TOR template along with full guidance on its use can be found for Task 2 in the Set Assessment brief.

It is important to remember that they cannot be used as a substitute for direct evidence that the candidate can produce. They should only be used to support and corroborate things like independent and safe working, or the quality of a finished product.

Task 5 – Quality control

It was evident that most candidates were able to undertake QC checks using their template(s) in most cases on the completed CNC manufactured component parts. There was evidence of using card or CNC-produced templates to check the completed CNC manufactured component. In some cases, they also appear to have matched them up to a scaled drawing which is not required. There were also good examples of where the template was rather a production aid, and was used to check certain features of the CNC-produced component (e.g. hole positions, angled features etc.)

It is also a requirement for this task for candidates to take measurements using suitable measuring equipment (e.g. steel rule, vernier calliper, micrometer etc.). Measurements should then be recorded and compared to those expected on the drawing. A tabulated approach to presenting and comparing measured and actual readings often works well, as does using annotated drawings. Annotated photos should also be used to show QC checks being performed and clearly show how the candidate has taken the measurements. They should then compare the measured and expected values, and make some comment as to what intervention, if any, is required.

Assessment for learning



Quality control:

You could supply candidates with a quality control template to use where they record expected and actual measurement values and indicate if these are acceptable or not and to note any intervention required.

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Why should you use our online courses?

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- learn about the key principles and processes of internal assessment and standardisation
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- see examples of student work with commentary and feedback from OCR moderators
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