

July 2012

Examiners' Report

NEBOSH National Diploma in Occupational Health and Safety - Unit C



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NEBOSH NATIONAL DIPLOMA IN OCCUPATIONAL HEALTH AND SAFETY

Unit C: Workplace and work equipment

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Introduction

NEBOSH (The National Examination Board in Occupational Safety and Health) was formed in 1979 as an independent examining board and awarding body with charitable status. We offer a comprehensive range of globally-recognised, vocationally-related qualifications designed to meet the health, safety, environmental and risk management needs of all places of work in both the private and public sectors. Courses leading to NEBOSH qualifications attract around 35,000 candidates annually and are offered by over 500 course providers, with examinations taken in over 100 countries around the world. Our qualifications are recognised by the relevant professional membership bodies including the Institution of Occupational Safety and Health (IOSH) and the International Institute of Risk and Safety Management (IIRSM).

NEBOSH is an awarding body to be recognised and regulated by the Scottish Qualifications Authority (SQA).

Where appropriate, NEBOSH follows the latest version of the “*GCSE, GCE, Principal Learning and Project Code of Practice*” published by the regulatory authorities in relation to examination setting and marking. While not obliged to adhere to this code, NEBOSH regards it as best practice to do so.

Candidates’ scripts are marked by a team of Examiners appointed by NEBOSH on the basis of their qualifications and experience. The standard of the qualification is determined by NEBOSH, which is overseen by the NEBOSH Council comprising nominees from, amongst others, the Health and Safety Executive (HSE), the Confederation of British Industry (CBI), the Trades Union Congress (TUC) and the Institution of Occupational Safety and Health (IOSH). Representatives of course providers, from both the public and private sectors, are elected to the NEBOSH Council.

This report on the examination provides information on the performance of candidates which it is hoped will be useful to candidates and tutors in preparation for future examinations. It is intended to be constructive and informative and to promote better understanding of the syllabus content and the application of assessment criteria.

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General comments

Many candidates are well prepared for this unit assessment and provide comprehensive and relevant answers in response to the demands of the question paper. This includes the ability to demonstrate understanding of knowledge by applying it to workplace situations.

There are always some candidates, however, who appear to be unprepared for the unit assessment and who show both a lack of knowledge of the syllabus content and a lack of understanding of how key concepts should be applied to workplace situations.

In order to meet the pass standard for this assessment, acquisition of knowledge and understanding across the syllabus are prerequisites. However, candidates need to demonstrate their knowledge and understanding in answering the questions set. Referral of candidates in this unit is invariably because they are unable to write a full, well-informed answer to one or more of the questions asked.

Some candidates find it difficult to relate their learning to the questions and as a result offer responses reliant on recalled knowledge and conjecture and fail to demonstrate a sufficient degree of understanding. Candidates should prepare themselves for this vocational examination by ensuring their understanding, not rote-learning pre-prepared answers.

Candidates should therefore note that Examiners' Reports are **not** written to provide 'sample answers' but to give examples of what Examiners were expecting and more specifically to highlight areas of underperformance.

It is essential that candidates are encouraged by the course providers not to attempt question prediction. The whole breadth of the unit can, and will be, examined and hence teaching and revision should never attempt to focus on providing answers to previous questions. In further stressing the importance of acquiring an understanding of the unit subject matter as opposed to rote learning; it is the intention to constantly revise the emphasis and demands for the questions which test any specific area of the syllabus. It should also be noted that any question which tests the candidates' ability to apply relevant calculations from information provided will undergo changes in elements for consideration and related numerical values in successive examination paper inclusions.

Common pitfalls

It is recognised that many candidates are well prepared for their assessments. However, recurrent issues, as outlined below, continue to prevent some candidates reaching their full potential in the assessment.

- Many candidates fail to apply the basic principles of examination technique and for some candidates this means the difference between a pass and a referral.
- In some instances, candidates do not attempt all the required questions or are failing to provide complete answers. Candidates are advised to always attempt an answer to a compulsory question, even when the mind goes blank. Applying basic health and safety management principles can generate credit worthy points.
- Some candidates fail to answer the question set and instead provide information that may be relevant to the topic but is irrelevant to the question and cannot therefore be awarded marks.
- Many candidates fail to apply the command words (also known as action verbs, eg describe, outline, etc). Command words are the instructions that guide the candidate on the depth of answer required. If, for instance, a question asks the candidate to 'describe' something, then few marks will be awarded to an answer that is an outline. Similarly the command word 'identify' requires more information than a 'list'.
- Some candidates fail to separate their answers into the different sub-sections of the questions. These candidates could gain marks for the different sections if they clearly indicated which part of the question they were answering (by using the numbering from the question in their answer, for example). Structuring their answers to address the different parts of the question can also help in logically drawing out the points to be made in response.

- Candidates need to plan their time effectively. Some candidates fail to make good use of their time and give excessive detail in some answers leaving insufficient time to address all of the questions.
- Candidates should also be aware that Examiners cannot award marks if handwriting is illegible.
- Candidates should note that it is not necessary to start a new page in their answer booklet for each section of a question.

UNIT C – Workplace and work equipment

Section A – all questions compulsory

- Question 1** ***Outline** the arrangements in a motor fleet policy that will minimise the risk to a company sales force in which the sales personnel are expected to spend around 150 days a year travelling around their respective sales areas.* **(10)**

Many candidates managed to gain high marks on this question. Those who did not perform well to did so for a number of reasons. A number of candidates stated “carry out a risk assessment” but when an outline of arrangements for risk minimisation is asked for, the candidate is expected to focus on the people, organisational and equipment related issues which a previous risk assessment process will have identified.

Some candidates answered the question with a focus on lone working. There was only one mark for violence and aggression issues, so they did not gain many marks for their answer. Candidates who thought about the issues involved in a logical manner identified the issues of individual competence, fitness and behaviour. They then approached vehicle selection and maintenance issues, together with procedural systems that such activities require, eg incident reporting, emergency procedures, journey planning etc which all gained marks if adequate reference as to their significance was given. Comments such as “provide information, instruction and training” did not gain any marks unless given relevance to the question.

- Question 2** (a) ***Define** the following terms:*
- (i) *flash point;* **(2)**
- (ii) *auto-ignition temperature.* **(2)**
- (b) *Flammable limit data, provided by a UK solvent manufacturer, as part of their safety data sheet, is given as the upper and lower flammable limits as percentages of vapour in air at standard air pressure and 20°C temperature.*
- Outline** the way in which this data should be interpreted to give practical guidance on the prevention of fire and explosion.* **(6)**

This question was generally not very well answered. The definitions required in part (a) are fundamental to an understanding of flammability information provided in safety data information. Imprecise statements such as “the point where” instead of referring to the “lowest temperature at which” would not gain marks. Similarly, failure to identify such concepts as “vapours igniting” or “application (or otherwise) of an external source of ignition” missed marks that should have been collected.

With regard to part (b), candidates were expected to address the information provided in flammability limit data to show the means by which this information is used to arrive at suitable controls. Many candidates wrote an answer on the generic requirements for storage of flammable substances in general, talking about security, ventilation,

construction of building etc. None of this information was relevant and in so being, did not attract any marks. Some candidates referred to combustible solids, gaining no marks as a result.

An adequate answer would have discussed the techniques for keeping atmospheric mixtures of air and vapour below the lower flammable limit, detecting approach to the flammable range, the way in which the range contracts or expands with temperature and the practical effects of this factor. The exclusion of the oxygen content in air as a means of preventing combustion should have been noted and the effects of pressure within processes using flammable liquids could have been referred to. Additionally, credit could have been gained by noting that the data applies to pure vapour only and not liquid droplets such as might be generated by spray processes. Drawing on the definitions given in part (a) would have indicated that operating at ambient temperatures below the flash point of the substance is the cut-off point at which a flammable atmosphere cannot be generated.

Question 3 *The condition of pipework 4m above ground requires inspection. It is proposed, in the absence of the availability of a mobile elevating work platform (MEWP), to utilise a personnel cage lifted to the required height by a forklift truck.*

Outline factors to be considered when assessing the risks specifically associated with this method of access. (10)

This was a question in which candidates did well and only let themselves down when they developed lists without providing an adequate outline of the issues they were including. In some instances, candidates were not well versed in the mechanics involved with forklift trucks, discussing stabilisers being deployed or similar. Other excessive management activities offered were informing the police and fire services and requiring radios for communication between the people in the cab and the forklift truck driver. Some candidates wanted to ring the manufacturers of the equipment and ask advice regarding how to utilise their equipment on this type of work which is frequently opportunistic. There was also some misapprehension as to how much the cage occupants and tools should weigh in relation to the forklift truck's safe working load. The Examiners were looking for 50% but many candidates thought it was equal to the full SWL.

Those candidates who did not perform well on this question usually gave insufficient detail about controls that should be put in place and concentrated on the working at height hierarchy despite this being the given scenario. Areas of available credit that were not well covered were reference to HSE GN PM28 (or knowledge of its contents), not being able to freely use the cage in the EU/not CE marked, ensuring optimum operating conditions etc, understanding of SWP implementation.

Question 4 (a) **Outline** the hazards associated with the use of steam in industrial power and heat generation systems. (5)

 (b) **Outline** causes and effects of the event known as a 'steam explosion'. (5)

This question was not well answered and identified a significant gap in the majority of candidates' knowledge. There appears to be a lack of understanding of the terms hazard, risk and outcome. Although the question asked for hazards, candidates were discussing burns and scalds to persons. Those candidates who successfully identified heat and pressure usually failed to address noise from leaks, steam 'hammer', static electricity generation and superheated pipework as a source of ignition. For part (b), many candidates described a simple over-pressure boiler explosion as a steam explosion

thereby receiving no credit. Very few were able to make reference to past events such as Corus Port Talbot (the syllabus example), Scunthorpe or Chernobyl.

Question 5 *A scaffolder is using a pulley wheel and rope to lower scaffold tubes from the third level of a scaffold to a colleague at ground level. The scaffold is adjacent to a shop front. The scaffolder on the ground floor is placing the scaffold tubes horizontally onto the back of a lorry parked on a busy road. The scaffolders have already received adequate information, instruction, training and suitable supervision.*

Outline *additional practical measures that could minimise the risk of injury to the scaffolders and others that may be affected by this activity.* (10)

This question was generally well answered. Some candidates concentrated too much on the manual handling risks to the operative at ground level rather than encapsulating the general risk and identifying practical remedial activity. There was no requirement for any technical assessment in this question; discussion around practical management of risk gained marks. Any discussion regarding design of scaffold and weekly inspections etc was not worthy of marks due to the fact that the scaffolding was being taken down and it should have been assumed that the scaffolding had been erected by competent persons. In addition, discussion about information, instruction and training did not gain marks as the candidates had been advised that these responsibilities had been discharged.

Some candidates lost marks by giving three or four separate answers to areas such as the inspection of the rope and pulley wheel or the management of traffic, to the exclusion of the full scope of credit worthy issues. Areas that candidates did not seem to consider were rigging/knot tying, job rotation to avoid upper limb disorders, pergolas and ply sheeting, the way the scaffolder mounts and dismounts from the lorry, fall mitigation from the lorry and, similarly, the use of airbags and netting to protect the scaffolder doing the dismantling.

Question 6 *A 150 year-old four-storey brick built brewery with a pitched slate roof is to be converted into executive apartments.*

(a) **Outline** *the causes of structural damage that a building surveyor might discover.* (5)

(b) **Outline** *the ways in which the conversion activities may give rise to structural failures.* (5)

Many candidates produced a list of elements that could affect the structural stability of a building, and Examiners were presented with a list of generic statements like wind damage, rain damage, temperature damage etc. The question required an outline of how these issues affected the structural stability of the building. Statements referring to damp or rotten woodwork did not gain marks because they did not refer to structural components. What was required was the influencing agent and the component that the agent acted on. 'Slate damage', again, did not give enough insight into what the candidate was trying to define. References to electrical and gas systems were not required unless they were clearly shown as having an effect on the structural stability of the building. References to corrosion / fatigue of steelwork in the structure gained no credit as the age of the building was deliberately chosen to pre-date the structural use of steel in construction. Very few, if any answers considered vegetation roots as a cause of undermining and no answers considered algae, cavitation or previous seepage from building use.

In part (b), removing structural load bearing walls or overloading the existing structure were popularly included in answers. Some candidates also correctly identified excavations and vibrations from use of mechanical plant

Section B – three from five questions to be attempted

Question 7 *During a fire drill exercise at a large multi-storey office premises, the majority of the occupants evacuated the building in less than three minutes. However, all of the people based in one area of the building failed to leave the building until a further four minutes had elapsed.*

- (a) **Explain** the issues that may have contributed to the delay in evacuation. (15)
- (b) **Outline** the advantages of undertaking regular fire drills in workplaces. (5)

The question was very popular and was attempted by the majority of candidates. It was noticeable that, although most candidates were able to gain marks in part (a), outlining what the issues could be that affected the response, many had difficulty in outlining the part (b) reasons why it is beneficial to have fire drills. Many did not recognise the benefit of gaining compliance with legislation. Again the spectre of listing was prevalent and candidates adopting such an approach were disadvantaged. Statements such as “they didn’t hear the alarm” gained no marks due to the fact that the statement was not conclusive in the factor that caused the lack of audibility eg excessive distance from sounder. In part (a), areas that candidates did not consider often were, as previously noted, reasons for attenuating the noise of the alarm, complexity of escape routes, difficulty of the procedures, no/insufficient duties of fire marshals, misinterpreting the fire alarm, delaying the evacuation to investigate why the alarm sounded.

In part (b), credit-worthy areas that were seldom addressed included: occupants’ familiarity with their duties, familiarity with routes/panic bars/bolts, targeted retraining and communication of procedure and investigation into need for fire alarm/building re-design.

- Question 8** (a) **Outline** factors that can increase the risks from the use of electricity on a construction site. (10)
- (b) **Outline** control measures that can be used to minimise risks from the use of electricity on a construction site. (10)

This was a popular question and in general, many marks were gained by candidates particularly in part (b). A common error on the part of some candidates, possibly due to failure to read the question properly, was to provide an answer to a question about the overhead supply of electricity. Other answers gave the lack of control measures required in the answers to part (b) as the reasons why the risk would be increased, but then failed to outline the necessary controls in their part (b) answer. Candidates should understand that not distinguishing which parts of the question their answer relates to will often lead to an inability on the part of Examiners to award credit.

Some candidates wrote in depth about safety in the use of electrical equipment which, although gaining some credit incidentally, did not warrant the effort expended. Marks often failed to be awarded for failure to relate such information to use on construction sites. The description of electrical risks on construction sites was often attempted without structure and full marks could not be gained.

In part (a), wet and muddy conditions and damage of cables by plant and equipment were popular answers. However, many candidates did not then go on to explain why these conditions would raise the level of the hazard. Other common part (a) oversights included failure to consider coiled cables causing induction/overheating, maintaining the safety of the temporary supply, improvisation/overloading, poor earthing and bonding issues.

Many went into detail about different contractors or international workers but not why this would have an effect. Candidates generally failed in part (a) to consider growth of the fixed/temporary supply and the need to reassess its adequacy, leading to 'regular testing of the fixed supply' being an appropriate point for part (b) inclusion.

Part (b) control measures most commonly overlooked included: cable detection, consulting utility plans, reference to IEE wiring regulations or HS(G) 47. PAT testing, excavation and overhead supply protection featured most often in part (b) credit-worthy answers.

Question 9	(a)	Describe the following hazards associated with an abrasive wheel:	
	(i)	mechanical;	(5)
	(ii)	non-mechanical.	(5)
	(b)	Describe the protective devices and guards that would be found on an abrasive wheel to minimise the risk of injury from mechanical hazards.	(4)
	(c)	Explain the risks associated with an abrasive wheel arising from its deterioration.	(3)
	(d)	Explain why employees require training for activities involving an abrasive wheel.	(3)

Some candidates could not distinguish between mechanical and non-mechanical hazards and a number failed to exhibit an understanding of what an abrasive wheel was. Others obviously knew how they could be used safely giving good answers to the first two sections. Some candidates immediately produced a list of words such as entanglement, cuts, grazes etc but failed to relate these concepts to abrasive wheels in a manner that constituted a description, as required by the question. In part (a)(ii), few answers considered ergonomic hazards, trips, over cables and sparks as an ignition source.

A widespread lack of understanding regarding the appropriate guards for abrasive wheels was evident. Many candidates thought that in identifying emergency stops and supplementary safety management issues, such as push sticks and light curtains, they were covering the required issues in response to the part (b) description about guarding. Few gave good answers to part (c) concerning a deteriorating disc with most just stating it would shatter. The erroneous concept of 'exploding wheels' also featured extensively.

Part (d) of the question was very poorly attempted with generic statements about HASAWA, PUWER etc which gained no marks but very little discussion about the issues that made it important to have employees trained when using the abrasive wheel. The specific training requirements relating to abrasive wheels is required to be covered as one of a small number of items of work equipment referred to in part 5.4 of the syllabus.

Question 10 *A company is planning a change of premises from one containing a 'manual' warehouse to one which contains automated order picking and automated guided vehicle (AGV) goods transfer facilities.*

(a) **Outline** the risks which might be reduced by the move. (10)

(b) **Outline** the risks which might arise from the move. (10)

This was a popular choice and was well answered by the majority of candidates. Most gave adequate descriptions of the hazards and the necessary control measures. There was some confusion when candidates dealt with the question as one on "robotics". Candidates who attempted this question invariably performed well in part (a). Areas they failed to consider were: absence of forklift trucks posing a lower source of ignition risk, reduction of heating and lighting costs and the avoidance of human error. Marks were frequently gained in part (a) by reference to the reduction in manual handling, working at height, and collisions with forklift trucks. Better answers went into more detail on how not being in the vicinity of the warehouse would reduce noise issues or other issues associated with driving forklifts.

Some candidates did not understand the implications of turning the warehouse activity over to robots and still had people fully involved in both scenarios.

In considering the answers provided to part (b), it was clear that AGVs were something of a grey area for many candidates with a subsequent inability to gain credit arising due to no visualisation or background knowledge to support them in their attempt.

While the AGV is a specific and widespread, application of robotics, many candidates unfortunately mistook the term AGV for simply robot and did not attempt a clearly focussed answer. Reference to "safety exclusion zones" was the most common manifestation of this problem.

Question 11 *A road haulage company intends to transport significant quantities of bulk flammable materials in tank containers. They are advised that they require a 'Dangerous Goods Safety Adviser'.*

(a) **Outline** the criteria under which a 'Dangerous Goods Safety Adviser' must be appointed. (4)

(b) **Outline** the particular duties of a 'Dangerous Goods Safety Adviser'. (6)

(c) **Outline** the procedures and practices that a 'Dangerous Goods Safety Adviser' should be monitoring in the event that the tender is successful. (10)

Although this question was the least popular in Section B, the candidates who attempted it gained reasonable marks. One of the main issues with the answers was that candidates thought that it was the Dangerous Goods Safety Adviser's direct responsibility to check things like accident reports, vehicle first aid kits and MOTs etc. In reality this could not be so - merely the Dangerous Goods Safety Adviser has responsibility for checking that there are procedures in the company to make sure these things are done. There were no marks for candidates who did make this clear distinction. There were a number of instances of candidates putting correct information in the wrong part of the answer and again they did not receive any marks for this. It is imperative that candidates read the question thoroughly and answer the question as asked in a clear and well-ordered manner.

In part (a), candidates usually identified the business of carriage of dangerous goods and the vocational training criteria but not the relevant exemptions.

In part (b), the duties to advise, monitor compliance, provide an annual report and prepare incident reports were covered in a wide range of detail provided. However, the majority of candidates attempting the question overlooked property damage or environmental damage as report-worthy issues.

Part (c) was frequently presented as a list of generalities. A few candidates addressed the correct procedural topics such as equipment checks, training records, emergency procedures, vehicle purchasing, special requirements in the selection of sub-contractors etc.



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