

July 2013

Examiners' Report

NEBOSH National Diploma in Occupational Health and Safety - Unit C



nebosh



Examiners' Report

NEBOSH NATIONAL DIPLOMA IN OCCUPATIONAL HEALTH AND SAFETY

Unit C: Workplace and work equipment

JULY 2013



CONTENTS

Introduction	2
General comments	3
Comments on individual questions	4

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 exams 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.

© NEBOSH 2013

Any enquiries about this report publication should be addressed to:

NEBOSH
Dominus Way
Meridian Business Park
Leicester
LE19 1QW

tel: 0116 263 4700
fax: 0116 282 4000
email: info@nebosh.org.uk

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 under performance.

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 *Under the Confined Spaces Regulations 1997, an enclosed space where work is undertaken is designated a confined space 'by virtue of its enclosed nature', in addition to where 'there arises a reasonably foreseeable specified risk'.*

Outline *the range of reasonably foreseeable specified risks that, if present, would cause the enclosed space to be designated a 'confined space' AND, in EACH case, outline a practical example of the specified risk.* (10)

This question related to Element C1 of the syllabus and assessed candidates' knowledge of learning outcome C1.3: *Explain the assessment of risk and safe working practices associated with work in Confined Spaces.*

It was expected that the range of specified risks listed in Regulation 1 of the Confined Spaces Regulations 1997 would be outlined and that candidates would outline a practical example for each of these risks.

Many candidates were able to recall the specified risks and provide the required examples, in some cases by deduction rather than specific knowledge recall, to achieve maximum marks.

However, a number of candidates were aware of some of the issues concerning confined spaces but were unable to translate their knowledge regarding hazards into an outline of risk as required. Although some candidates were aware that there may be a lack of oxygen in a confined space, they failed to relate this to the consequences and therefore failed to gain the available marks.

Some candidates did not answer the question set and resorted to general discussion about hazards encountered in confined spaces or described what constituted a confined space and the need for a permit to work system to control the work. Marks could not be awarded for this.

An understanding of the criteria to define confined spaces is an essential element of the judgement call frequently required of a health and safety practitioner. At Diploma level, the understanding of the difference between hazard and risk is a fundamental requirement that should be well established in the candidates' understanding. Tutors should ensure their coverage of the syllabus clearly provides such understanding.

Question 2 *Senior management in a large food processing plant are concerned at the increasing cost of the planned preventive maintenance programme that is currently used to maintain the equipment in the plant.*

Outline the following two types of maintenance that could be considered as a replacement to the planned preventive maintenance programme, justifying reasons for the replacement:

- (a) *breakdown maintenance;* **(5)**
 - (b) *condition-based maintenance.* **(5)**
-

This question related to Element C5 of the syllabus and assessed candidates' knowledge of learning outcome C5.3: *Explain safe working procedures for the maintenance, inspection and testing of work equipment according to the risks posed.*

An adequate answer to this question required candidates to understand and outline a technical description of the two replacement strategies and then outline the justification for adopting either. Many candidates had however studied planned preventative maintenance at the expense of understanding the alternatives and were unable to outline those included in the question.

While the majority of the better answers gained marks for breakdown maintenance and reasons to use, many attempted to turn the question around and gave reasons not to use either of the strategies in question. The understanding of condition-based maintenance was generally limited, with many candidates failing to outline its features and simply restricting themselves to the area of justification. Few candidates gave an outline of why condition-based maintenance would be beneficial and mainly confined their answers to limited details of checking parts until they were worn out and changing prior to failure.

Nothing in the learning outcome advocates planned preventative maintenance to the detriment of other strategies. However, this misconception appears to be so prevalent that tutors should question the impression created by the emphasis made during teaching.

Question 3 **Describe** the principles of safety integration that must be followed by manufacturers who supply new machinery into the European Economic Area. **(10)**

This question related to Element C6 of the syllabus and assessed candidates' knowledge of learning outcome C6.1: *Describe the principles of Safety Integration and the considerations required in a general workplace machinery risk assessment.*

Annex 1 of the EC machinery directive 2006/42/EC gives the principles of safety integration to be followed by manufacturers who supply new machinery into the European Economic Area.

This question revealed most acutely the problem of candidates confining their revision to what has previously been asked in question papers rather than what could be asked (ie the entire syllabus).

Many candidates addressed this question as though it was about CE marking procedures and continued to answer the question in that vein. Much effort was wasted discussing the labelling of machinery and the information required to be placed on it

for little or no credit. There was a fundamental confusion in many candidates' minds regarding the applicability of Essential Health and Safety Requirements and Technical Files to this question as they had clearly focussed their revision on a previous examiners report which discussed such a question.

Very few candidates gave credible answers to this question.

Question 4 The owners of a large distribution warehouse business have secured a contract from a stationery manufacturer. Their insurers have recommended that the proposed storage facility is sprinkler protected.

Outline the factors to be considered in providing an adequate sprinkler system for the storage facility. (10)

This question related to Element C3 of the syllabus and assessed candidates' knowledge of learning outcome C3.4: *Outline the factors to be considered when selecting fixed and portable fire-fighting equipment for the various types of fire.*

Most candidates had a good understanding of this practical subject matter and the question was generally well answered.

Most candidates gained marks for outlining features such as: a sufficient water supply and back-up pumps; how to distribute the sprinkler heads and protect from damage and how to cope with run-off.

Some candidates limited themselves by digressions which included the use of other types of fire suppression which would not be appropriate.

A number of candidates just wrote all they knew about the subject without addressing the focus of the question. It would be a marked improvement if accredited course providers reinforced the examination technique of concise and logical discussion of the area in question under appropriate headings. In some cases marks were difficult to award as the answers were couched as rhetorical questions and did not provide sufficient confidence that the candidate was certain of the information they were asked to provide. In a number of cases not enough was written to gain maximum marks.

Question 5 *An organisation uses a number of non-compatible reactive chemicals as part of its manufacturing process. Chemicals from a supplier are delivered in bulk by road tankers, operated by a haulier, and are transferred to storage tanks on the customer's site.*

Outline procedures that should be in place, at **EACH** stage of the supply process, to help ensure that the chemicals are transferred to the correct storage tanks to reduce the risk of a fire similar to the one that occurred at Albright and Wilson in 1996. (10)

This question related to Element C4 of the syllabus and assessed candidates' knowledge of learning outcome C4.2: *Outline the main principles of safe storage, handling and transport of dangerous substances.*

Answers to this question were generally limited. Only a small number of candidates had a clear idea of what occurred at Albright & Wilson in 1996. It is hard to discern if this was due to lack of initial information from course materials or due to a revision process that ignored certain areas of the syllabus.

A few candidates did run through the process of document management and sampling the actual chemical on arrival at the customer's site but ignored the other elements of the supply process (given in the question stem) that was required by the question.

The majority of attempts went into unsolicited information such as physical features of the site and failed to address the ways in which product identification / document management can control the risk of cross contamination. Marks could not be awarded for this, other than for reference to different types of connectors and labels on tankers.

Even though many candidates did not know the procedures that should be taken to ensure correct transfer of chemicals, they would have managed to gain some marks if they had organised their answers to address the issues from the points of view of each party involved – supplier – haulier – customer.

Over-generalisation was a common weakness, with candidates discussing things like training, supervision, PPE, paperwork etc without discussing the context which the example was being used in. There was frequent discussion about flammability and static protection which was not relevant to the question and therefore could not attract credit.

Question 6	(a)	Outline the range of information that should be included on an organisation's standard form for the internal reporting of work-related road traffic incidents.	(7)
	(b)	Outline the likely content of an 'in-vehicle response kit' for use by a driver involved in a work-related road traffic incident.	(3)

This question related to Element C10 of the syllabus and assessed candidates' knowledge of learning outcome C10.2: *Outline the factors associated with driving at work that increase the risk of an incident and the control measures to reduce work-related driving risks.*

Almost all candidates were able to answer this question well and many gained the maximum ten marks. On the whole, this question was well answered and candidates who could think logically and discuss the issue of the provision and recording of relevant information subsequent to a work related road traffic accident occurring were awarded good marks. Marks were not awarded when there was too much generalised information. Statements like "who was driving", "name of person", "weather", "which vehicle", were made and it was left for the examiner to try and make the link with the question asked which in some cases was not possible.

Part (b) was answered quite well with most candidates being able to provide an outline of the equipment required.

Some candidates gave comprehensive answers about HGVs carrying bulk chemicals and the associated precautions and spill kits etc – wasting time and effort and not giving the more generally applicable information required by the question.

In some responses there was an over-focus on the company driver whilst forgetting the third party. Answers often drifted from reporting into investigation and sometimes recovery with the response kit including items such as a jack and spare wheel.

Section B – three from five questions to be attempted

- Question 7**
- (a) By reference to the Pressure Systems Safety Regulations 2000, **explain** what is meant by a 'pressure system'. (6)
- (b) A compressed air system is to be installed in a motor vehicle repair workshop.
- Outline** the safety requirements that should be met before the system is commissioned. (14)

This question related to Element C11 of the syllabus and assessed candidates' knowledge of learning outcomes C11.2: *Outline the key features and safety requirements for 'simple' unfired pressure systems*, and C11.3: *Outline the key features and safety requirements for process pressure systems*.

A substantial (although not required to be perfect) recall of the definition of a 'pressure system' contained in the Pressure Systems Safety Regulations 2000 would have gained full marks in part (a). Many varied descriptions of a pressure system were offered with many candidates mixing everything up and coming out with a hybrid answer. However, most candidates who attempted this question knew something about the regulations and were able to gain some marks.

Answers to part (b) were generally limited. Training was often mentioned but without any understanding relevant to the question being evident. Many candidates wrote too much on protective devices at the expense of gaining marks in other areas.

Some very limited understanding of the component parts of a compressed air system was evident. Many candidates failed to consider noise disturbance, dust, protection from vehicle impact, other hazards (eg heat/loading/flammable atmospheres, capacity, layout, work done, compliance with 1999 Regulations/CE marking, guarding, safety of electrical installation, emergency arrangements).

-
- Question 8**
- (a) **Outline** examples of protection on electrical equipment that can reduce the risks of a direct electric shock under no fault conditions. (3)
- (b) **Outline** examples of protection on electrical equipment that can reduce the risk of indirect electric shock under single fault conditions. (6)
- (c) **Outline** the precautions that should be considered to prevent injury when working live on a UK 230v electric circuit. (11)

This question related to Element C8 of the syllabus and assessed candidates' knowledge of learning outcome C8.3: *Outline the issues relevant to the installation, use, inspection and maintenance of electric systems*.

This was not a question favoured by a large proportion of candidates.

Of those candidates who attempted this question, few managed to achieve greater than half marks. Responses often showed a lack of understanding of the safety requirements related to electrical installations. The definition of double insulation was widely misunderstood by a good proportion of candidates. Additionally, many

candidates discussed the use of fuses as protection which was not correct and showed a lack of theoretical knowledge about installation practice. Generally those who attempted this question lacked the breadth of scope to gain good marks, producing answers more akin to a Certificate level response.

In part (a), many candidates outlined indirect protection with fuses and RCDs and not direct protection. Better answers referred to points such as insulation, barriers, very low voltage and keeping items out of reach.

In part (b), most candidates only outlined fuses, RCDs and MCBs but not the full range of means of protection. Better answers mentioned use of 110v and earthing.

In part (c), answers often referred to use of rubber matting, insulated tools and insulated gloves. Many candidates went into great detail on why it shouldn't take place, which was not required. Many failed to mention that the electrician should be competent to carry out the work.

Question 9

As part of its water treatment system, a manufacturer is to install a plant suitable for the reception and storage of sulphuric acid and caustic soda, both of which will be delivered in bulk tankers. Both of these substances are highly corrosive and can react together violently.

Outline the provisions required for the proposed storage facility to give:

- | | | |
|-----|--|-------------|
| (a) | <i>inherent plant safety by design;</i> | (10) |
| (b) | <i>employee safety in routine operation;</i> | (6) |
| (c) | <i>safety during maintenance activities.</i> | (4) |
-

This question related to Element C4 of the syllabus and assessed candidates' knowledge of learning outcome C4.2: *Outline the main principles of safe storage, handling and transport of dangerous substances.*

This question required consideration of features to ensure safety by design, safety in operation and maintenance. Despite the fact that no mention of flammable chemicals appears in the question, many candidates appeared to have revised flammables in preparation for it, should it have appeared again. They appeared unable to divorce themselves from this preparation and therefore answered a question that was not there. Offerings such as "clearing vegetation" may have been a requirement of the question they had revised but it was not relevant to the question in hand and therefore marks could not be awarded. Such candidates also addressed fire fighting and explosion protection, neither of which were applicable to the scenario described.

In part (a), candidates often gained marks for a treatment of bunding and segregation but didn't expand into further considerations of leak / spillage prevention and containment. Emergency response features did not figure largely either. Some candidates did not understand what is meant by design and included PPE considerations in their part (a) answer.

Parts (b) and (c) were generally better answered by the candidates attempting this question.

In part (b) many candidates gained marks from PPE and supply of emergency showers but ignored the interactions from tanker to storage and storage to use.

In part (c), almost all candidates mentioned permits to work and a few candidates referred to purging and flushing out the system prior to work commencing.

Unfortunately too many digressed, unnecessarily, into descriptions of confined space training and the requirements for access and egress.

Question 10 *In relation to dust explosions:*

- (a) **explain** the conditions that must be present for a primary dust explosion to occur; (4)
- (b) **explain** the additional conditions necessary for secondary explosions to occur; (4)
- (c) **identify** the causes and effects of the General Foods dust explosion, Banbury 1981; (4)
- (d) **identify** the design features that would minimise the likelihood and effect of a dust explosion. (8)

This question related to Element C2 of the syllabus and assessed candidates' knowledge of learning outcomes C2.1: *Outline the properties of flammable and explosive materials and the mechanisms by which they ignite* and C2.3: *Outline the main principles and practices of fire and explosion prevention and protection.*

Many candidates attempted this question and gained marks in part (a) for combustible dust, airborne and a source of sufficient ignition, although the issue of a sufficiently energetic source was commonly overlooked. A number of candidates did not give sufficient explanation to convert their offered lists into outlines.

For part (b) most candidates were able to describe how further dust will be raised by the pressure wave of the primary explosion, and how the dust would be ignited by the first.

Those who knew about the incident gained good marks in part (c) but many candidates just described / theorised what could have happened in a custard factory rather than what did.

The most popular answers to part (d) only identified the use of LEVs and removing horizontal surfaces that might retain dust. Many candidates wanted people cleaning the area and improving housekeeping.

-
- Question 11** *A two-year construction project to build an inner city major train station is to be undertaken. The 30,000 square metre, rectangular site on which it is to be built will be bounded by public roads on all four sides. Construction planners have decided that in order to efficiently organise load handling throughout the project, three conventional tower cranes will be required at all times during construction.*
- (a) **Outline** the factors that should be specifically considered in the safe selection and placement of tower cranes on the construction site. (10)
- (b) **Outline** the health and safety considerations that the construction phase health and safety plan should address when excavating and preparing the foundation pads on which the tower cranes will stand. (6)
- (c) **Outline** the circumstances that would require a tower crane to be subject to a thorough examination and inspection. (4)
-

This question related to Element C7 of the syllabus and assessed candidates' knowledge of learning outcome C7.2: *Describe the main hazards and control measures associated with commonly encountered lifting equipment* and Element C9 of the syllabus which assessed candidates' knowledge of learning outcome C9.2: *Explain the scope and application of the Construction (Design and Management) Regulations 2007.*

This question probed three distinct areas all of which should have been familiar to candidates. The responses held this to be true for the greater part although there were some exceptions.

For part (a) many provided excessive detail for preventing the cranes from clashing, being able to lift the required loads, and oversail buildings or roads. Less well covered were the issues concerning the constricted nature of the site and the issues regarding the progression of the site layout. Some candidates attempting this question clearly had no mental image of a tower crane to assist them, as their answers referred to the use of outriggers despite part (b) referring to the necessary foundation pad.

Part (b) was generally less well answered. Candidates failed to take note of the question requirement and framed their responses to provide excavation next to the crane not the foundations for the crane.

Better answers included services and the soil conditions. Although most advocated care in the detection and exposure of buried services, very few made the logical progression to diverting them. Some candidates went off on a tangent describing welfare and construction phase plans as CDM (2007) requirements. Very few remembered that inspection of excavations and the temporary works would be required. Some candidates exhibited little or no understanding of the CDM requirements regarding excavations.

In part (c) many candidates successfully outlined first installation and after the crane had been affected by weather or collision. Very few mentioned the additional LOLER requirements of longevity and reconfiguration.



nebosh

The National Examination
Board in Occupational
Safety and Health

Dominus Way
Meridian Business Park
Leicester LE19 1QW

telephone +44 (0)116 2634700
fax +44 (0)116 2824000
email info@nebosh.org.uk
www.nebosh.org.uk