NEBOSH

DO – CONTROLLING WORKPLACE SAFETY ISSUES (INTERNATIONAL)

UNIT DI3:

For: NEBOSH Level 6 International Diploma for Occupational Health and Safety Management Professionals

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Guidance to learners

This assessment is not invigilated, and you are free to use any learning resources to which you have access, eg your course notes, or the HSE website, etc.

By submitting this completed assessment for marking, you are declaring it is entirely your own work. Knowingly claiming work to be your own when it is someone else's work is malpractice, which carries severe penalties. This means that you must **not** collaborate with or copy work from others. Neither should you 'cut and paste' blocks of text from the Internet or other sources.

The assessment begins with a scenario to set the scene. You will then need to complete a series of tasks based on this scenario. Each task will consist of one or more questions.

Your responses to **most** of these tasks should wholly, or partly, draw on relevant information from the scenario. The task will clearly state the extent to which this is required.

The marks available are shown in brackets to the right of each question, or part of each question. This will help guide you to the amount of information required in your response. In general, one mark is given for each correct technical point that is clearly demonstrated. Avoid writing too little as this will make it difficult for the Examiner to award marks. Single word answers or lists are unlikely to gain marks as this would not normally be enough to show understanding or a connection with the scenario.

You will have 2 weeks (10 working days) to complete the assessment.

Please refer to your registration confirmation email for the upload deadline.

Please note that NEBOSH will be unable to accept your assessment once the deadline has passed.

You **must** use the available answer template.

SCENARIO

Habitect Nature Build (HNB) employs 150 workers and have 15 years' experience in the construction industry. They are one of the contractors chosen to help deliver a large infrastructure project for a client.

The project involves the construction of a new railway line. The scope of the contract is to create new habitats for wildlife and plants displaced by the proposed rail line route. The client has awarded HNB a group of sites to manage along this new rail line route.

Site A

Site A is one of the sites due to be managed by HNB. It has approximately six hectares of rural land, with some ditches and uneven ground.

Access to this site is through a working livestock farm where animals are allowed to roam. The farm is located one kilometre from the project location. A temporary road has been installed for safe access to the site entrance from the farm.

The project plan for site A includes the creation of 14 ponds varying in size across the site. The primary purpose of this is to create a new habitat for a protected native species, that would be displaced by the construction of the railway line.

Another large part of the project is to plant over 12000 young trees on site A. At peak times, there is planned to be around 50 workers on site, including the site supervisor, site vehicle operators, and a lifting operations team. Three expert tree planters will be supported daily by approximately 10 - 15 volunteers from the local conservation volunteers' group (LCVG).

For many in the LCVG, this will be their first exposure to a large infrastructure project and to heavy machinery.

There is an active, buried, aviation fuel pipeline running through site A from the east to the west. There are also 11kV overhead power lines on wooden poles that cross the site from north to south at the eastern section of the site. Two of the ponds are to be created under these power lines. As a result, the work beneath the overhead power lines will be controlled through the use of barriers, bunting and warning signs.

The project is expected to last eight months. Workers are expected to arrive on site at 08:00 and finish at 16:00. Many of the site vehicle operators have a long commute from their homes to the site. In accordance with the 'driver fatigue risk management policy' available on HNB's intranet, they have been given the option to stay at a nearby hotel up to three times a week. This 'driver fatigue risk management policy' was developed three years ago, due to the increase in reports of road incidents involving workers travelling to and from sites.

Project preparation

HNB has arrived at site A. The site supervisor has operational and safety responsibility over the day-to-day running of site A, and is trained in appropriate scanning techniques. Using the utility service drawings and relevant guidance documents, they begin to conduct a scan to identify the exact location of the aviation fuel pipeline and any other underground services. This information will be used to mark out any services, along with the outline of the ponds. During the scanning and marking out process, the site supervisor is called away to manage a materials delivery to the site, taking the scanner with them. When they return, a worker states that they have completed marking out the outline of the ponds by referring to the plans.

An exclusion zone of five metres each side of the aviation fuel pipeline is defined with fixed, metal mesh fencing. An access ramp is made from thick oak blocks bolted together, which is then installed across the area of the aviation fuel pipeline to form a sloped bridge. In total, there are seven large 360 excavators, and ten large dumper trucks required to use this crossing point to access both sides

of the site. This crossing point is supervised by a trained banksman. Access to site A is also controlled by a gate and security cameras 24 hours a day, seven days a week.

A temporary wooden shelter is built, and situated near to the site entrance. The shelter has two exposed sides to allow for easy access. It stores various pneumatic tools and other hand tools, alongside a diesel-driven portable air compressor with twin air outlet connections. This air compressor has a large capacity tank capable of delivering 800 litres per minute. It has a pressure regulator, two tank pressure gauges, and a pressure relief safety valve to automatically reduce engine speed when the maximum pressure of 10 bar is reached. It will be used to supply air for inflating machinery tyres, the pneumatic tools, and for general vehicle maintenance. One of the air lines is dedicated to an air blow gun, that will be used to dry and clean equipment. The compressed air blow gun and other attachments are connected via 10-metre flexible air hoses.

The air compressor is regularly transported to wherever it is required around site A. Originally, it had four robust rubber-padded feet. One of the rubber pads, and the manufacturer's operating procedures, were lost during the process of being transported to site A. HNB has used this air compressor for many years, but some workers have complained how noisy it has become, especially due to the hissing sounds coming from various pipework connections. The site supervisor feels that it is a waste of time arranging for the air compressor to be serviced, as nobody knows exactly how old it is, and they will continue to use it until it fails.

The client has instructed that all refuelling of machinery will be carried out on site directly from a tanker, rather than having diesel stored on site. A refuelling area of hardstanding concrete is created for the tankers; this is close to a watercourse. Diesel tanker deliveries have been arranged approximately three times a week. HNB has developed a suitable emergency spill response plan, including spill kits and emergency sand, that is approved by the client. HNB's workers are made aware of the emergency spill response plan and trained in the use of spill kits.

Creation of the ponds

Creation of the ponds has begun using the excavators. All workers employed by HNB have the appropriate machinery licences. Plastic-handle and rubber-handle tools are also available for hand digging.

The sides of the pond excavations are battered, following a graded sloping profile. A layer of soil is scraped, and re-scanning is conducted at regular intervals before digging deeper. In some areas, the ground and soil are still very wet from recent heavy rain and wind, so trial holes are dug. A two-metre exclusion zone is identified, and plastic red and white barriers are installed around the excavations before moving to the next excavation. During the process, the excavated soil is transported via dumper trucks to a stockpile situated 250 metres from each excavation site. As the site is noisy, during loading, the excavator operator speaks to one of the dumper truck operators using a two-way radio. They then position themselves in front of the excavator ready for loading. Other dumper truck operators wait in line for instruction. A banksman is present to direct the movement of vehicles, and aid with communication.

Three months into the project, due to the continued bad weather, the work on site A is four weeks behind schedule. Despite the ground and soil still being wet and muddy, the creation of the ponds has continued as planned. Some workers, including the LCVG volunteers, have been using the air blow gun to blow dried mud and dust off their clothes, shoes and cars, before and at the end of their shifts. Permits to excavate are being used throughout the duration of the pond creation process.

The site supervisor has asked all workers to be vigilant of trespassers, as a part of the metal mesh fencing has recently been found to have a section missing. The site supervisor also calls for an increase in the pace of work, and requests workers to work overtime to be able to meet the proposed deadline. Many workers agree to the extra hours as they are staying in the hotel near to the site and welcome the opportunity to earn more money. However, one of the workers declines due to becoming a first-time parent; since the beginning of the project, they have been driving to and from the site for a total of three hours every shift to be with their family.

Near miss and refuelling leak

Some of the excavators and dumper trucks have nearly run out of fuel. The delivery of fuel has been delayed due to a road traffic accident, causing further delays to the work schedule. The fuel tanker driver finally arrives on site. They speed down the temporary road and hit a tree branch on the side of the tanker where the valves attach to the hose.

One of the excavator operators receives a signal from the banksman to move the excavator to the hardstanding area for refuelling. A dumper truck operator also starts to drive closer to the hardstanding area. As the excavator starts to reverse, the banksman begins to walk away as they receive an unexpected delivery. The excavator's arm swings towards the dumper truck that is driving towards its position. The dumper truck operator brakes suddenly, narrowly missing the excavator. The banksman returns and explains that they were only signalling the excavator operator to move. Feeling embarrassed, the dumper truck operator explains that they were working late the evening before and had an early start driving to the site this morning. During the commotion, one of the volunteers from LCVG comes to see what is happening. The banksman explains that they should not be in the vicinity. There are signs and barriers, but some of these have been blown six metres away by the wind.

The excavator operator continues moving towards the refuelling area. While refuelling, the site supervisor notices that fuel is leaking from the valve on the fuel tanker onto the open ground next to the hardstanding area. The tanker driver cannot find the spill kit in their vehicle. The site supervisor executes the site emergency spill response plan and contains the spill. The client is informed of the spill and attends the site to check on the effectiveness of the emergency response by the tanker driver and HNB. The tanker is due for routine maintenance checks the following week.

Pond liner lift

All 14 pond excavations are nearly complete. Some of the workers have been missing their families and have started driving to and from home more regularly, rather than staying at the hotel. This has resulted in some workers starting their shifts later than usual, due to traffic conditions.

Delivery of the pond lining is expected on site in three-metre-width rolls. The lifting plan requires the rolls to be lifted over the entire ten-metre exclusion zone by one of the excavators, using a spreader bar. The lift has been planned by the lifting supervisor and the lifting appointed person on site. The lifting plans have also been approved by the client. The final lifting plan is then communicated to the lifting team, comprising of a banksman, a signaller, a lifting supervisor, and a lifting appointed person.

Once the pond lining is in position, workers will manually roll it out and secure the pond lining with anchor trenches that have been dug around the outside area of the ponds.

Each roll of pond lining material weighs two and a half tonnes. The lifting appointed person has decided to use disposable lifting strops (webbing slings made from synthetic fibre) for this lift, which was not in the original plan. The disposable lifting strops are retrieved from a nearby delivery vehicle that has been used to deliver the pond liners. The original lifting plan specified chains to be used; however, these are nowhere to be found. As the lift starts, the lifting strops fail, dropping the pond liner rolls into the exclusion zone. The incident is recorded on the site's security cameras. An incident investigation is initiated to establish what happened. It is found that the disposable lifting strops were badly worn, as they had been in use for over 12 months.

Pond filling

Water tankers arrive on site to fill the ponds; 50 tanker deliveries are needed in total. Tankers cannot cross the aviation fuel pipeline due to their weight, so they are directed to a water delivery zone, 600 metres from the nearest pond. Hoses are used to transport water across the site to the ponds. Due to the long distance and site gradient, diesel-powered water pumps are placed along the water pipelines at 300-metre intervals. The water pumps are also portable and often transferred to new locations for use. This type of water pump has been a vital piece of equipment for HNB for many years due to its high maximum flow rate and large 127mm (5") hose diameter.

During water deliveries, workers are stationed near to the water pumps to check for leaks along the pipeline. These workers are often seen yawning, and complain of having headaches during warm weather.

Once the pond filling has been completed, the pumps are shut down and dismantled. They are then removed from the site on a flatbed truck.

Supporting Documents

1. Permit-to-work
2. Driver fatigue risk management policy

Task 1: Excavation work

1 (a) What was positive about the way the excavation work was managed? **(20)**

Note: *You should support your answer, where applicable, using relevant information from the scenario.*

(b) What improvements would make the excavation work safer? **(8)**

Note: *Your answer must be based on the scenario only.*

Task 2: Lifting operations

2 (a) What should have been considered when selecting lifting accessories for the pond lining lift? **(15)**

(b) Excluding lifting accessories, what control measures should be considered when carrying out the pond lining lift? **(22)**

Note: *You should support your answer, where applicable, using relevant information from the scenario.*

Task 3: Pressure systems

3 (a) Why would the compressor unit be classified as a pressure system? **(5)**

Note: *You should support your answer, where applicable, using relevant information from the scenario.*

(b) Explain why air compressor-related activities could be hazardous. **(12)**

Note: *You should support your answer, where applicable, using relevant information from the scenario.*

(c) Explain what further control measures should be put in place to help reduce the risk of a pressure system failure. **(21)**

Note: *You should support your answer, where applicable, using relevant information from the scenario.*

Task 4: High-voltage permit-to-work

4 Two of the excavations were underneath high-voltage overhead power lines. The electricity supplier was able to isolate these lines. A high-voltage permit-to-work would be required (**see supporting document 1 (SD1)**).

What sections would you add to the permit, to further minimise risk? **(12)**

Task 5: Pumping water into the pond and removing the water pumps from the site

5 (a) What should have been considered *before* starting the pond filling activity? **(15)**

Note: *You should support your answer, where applicable, using relevant information from the scenario.*

(b) The pond filling activity has been completed, the pumps have just been shut down, and there is a need to dismantle and remove them from the site onto a flatbed truck.

Devise a standard operating procedure for this task. **(10)**

Note: *You should support your answer, where applicable, using relevant information from the scenario.*

Task 6: Refuelling plant machinery

6 HNB is now considering storing diesel on site in storage tanks to refuel plant machinery.

(a) Discuss the positives and negatives for storing diesel on site. **(15)**

Note: *You should support your answer, where applicable, using relevant information from the scenario.*

(b) What aspects of the response to the fuel spill worked well? **(5)**

Note: *Your answer must be based on the scenario only.*

Task 7: Work-related driving

7 Explain how the 'driver fatigue risk management policy' has *not* been effective? **(15)**

Note: *Your answer must be based on the scenario and* ***supporting document 2 (SD2)*** *only.*

End of assessment

Now follow the instructions on submitting your answers.

Disclaimer

This case study is entirely fictional. It has been crafted to simulate a realistic situation in order to assess your ability to apply theoretical knowledge to practical problems. Some details in this case study may reflect the author's real-world insights or experiences. However, for the purpose of assessment, factual details have been changed or fictionalised. No element of the content is intended as a factual representation of any specific person, organisation, or event.