CPCS renewal test factsheet

Introduction to the CPCS renewal test

The industry-led CPCS Management Committee has determined that key safety-related knowledge must be checked on each category prior to the renewal of a CPCS Competent Operator (blue) card. The CPCS renewal test is the means by which blue cardholders will be tested on topics that reflect safety issues identified through consultation, that occur regularly on site.

For each topic identified there is a set of questions, from which a number will be included in the test and for which supporting information is provided in this factsheet. Each test will ask a total of 15 questions selected randomly to ensure all topics are covered.

The test will cover all categories within the scheme through modules. Some modules have been devised to cover a range of similar CPCS categories.

The CPCS renewal test is available on the CITB-ConstructionSkills Testing Services platform alongside the Health, safety and environment test.

The questions and answers will not be published but factsheets are available for each module to cover the topics.

How to use this factsheet

Prior to taking the test, cardholders are advised to carefully study the factsheet, which will prepare them in deciding the correct answer or answers to each given question. Correct answers are based on legislation or good practice adopted, in the majority of cases, by the construction and allied sectors.

It is acknowledged that variations may occur depending on the nature of the operation or on how the machine is used. However the correct answer to each question is based on common practices or manufacturers' requirements for the majority of machine types within each module, and applies to this test irrespective of how a machine may be used within a particular activity or sector. It is important, therefore, that this factsheet is studied carefully.

The questions are selected randomly and will not appear in the order that topics appear in this factsheet.

If the card holder does not answer all the questions correctly, the score report issued after completing the test will indicate the topic areas in which the questions were answered incorrectly. The cardholder should, prior to retaking the test, re-study all topic areas.

Scoring the test

To be successful in this module, cardholders need to correctly answer a minimum of 12 out of the 15 questions presented. However, because many of the questions are safety-related, in the majority of cases, a minimum number of questions per topic need to be answered correctly. Failure to do so, even if the overall minimum number of correct answers has been reached, may mean that the cardholder is unsuccessful on the test.

The top of each topic states the number of questions that will be presented for each topic and the minimum number of questions that must be answered correctly in order to pass the test.

Concessions

To avoid duplication of questions where similar categories are held, booking concessions are provided. This means that, if several similar categories are held, only one module needs to be booked. The following chart indicates if there is a booking concession for this category.

Concessions are provided to holders of the category of Dragline.

Other categories held:	Needs only to book:
No concessions available	No concessions available

Note: *The above concessions are an outline of what tests you may have to book; please refer to Module matcher for details of full concessions where more than one category is held.*

This factsheet has been designed to highlight only topics that have been identified through industry consultation area with safety issues or where good practice is often not complied with. The questions within the CPCS renewal test for this category also reflect this.

It is not intended as a training tool and cannot list all essential knowledge and understanding for this category. Operators must always follow manufacturers' requirements, industry good practice and be aware of their own limitations with the machine, and seek further guidance and help where needed.

Further information about the CPCS renewal test can be found at www.cskills.org/cpcs

Preparation and completing work *(Preparation)*

Topic scoring information: 0 correct answers required out of 2 questions presented to pass

- Draglines are one of the earliest forms of mechanical excavating with many sizes and weights of machines used over the years. Nowadays (predominately for UK-based operations) they are based on a crawler-crane using a lattice-type jib or boom and fitted with both a hoisting winch and drag winch. Draglines are mainly used outside of direct construction activities and are predominately for extracting materials (such as aggregates) or for dredging/desilting-type work. Draglines are operated by dedicated and experienced operators, but accidents and incidents do occur, particularly because of instability. This factsheet aims to highlight some of the factors that can cause issues which, in some instances, have occurred with fatal consequences.
- Proper pre-use checks are a requirement for the safe operation of any type of plant, including draglines, and the operator is expected to undertake them at the required intervals. Failure to properly check all relevant components of a dragline could mean that, as with all plant and machinery, incidents or injuries occur because faults or defects can affect both performance and safety. For example, wire ropes are subject to stresses and strains which limit the working life of a hoist or drag rope. Wire rope fatigue is usually most evident near to a socket for which regular checks should be made in this area.
- Checks and inspections that need to be made are indicated in the operator's or user's manuals for the dragline. Although the frequency of checks will be determined by the manufacturer, extreme or environmentally harsh operating conditions may mean that more frequent checks are required. Draglines should undergo a thorough examination and all components be thoroughly examined and undertaken by a competent person, who will also determine when these examinations should take place. Although operators do tend to undertake the daily checks, they can also undertake more in-depth weekly checks and adjustments if they have had additional training for the checks required for that model of dragline.

Working safely

Topic scoring information: 4 correct answers required out of 8 questions presented to pass

- Conditions within the working area need to be taken into account before, during and after work. The jib must be kept well clear of any overhead power lines. Guidance from the Health and Safety Executive advises that at least 15 metres plus the maximum reach of the boom is kept from power lines mounted on metal pylons, whilst 9 metres is kept from power lines mounted on wooden poles. Wind speeds should be regularly monitored so that work only proceeds when they are below the maximum authorised speed stipulated by the dragline manufacturer, as wind loadings of the boom and/or dragline bucket can cause handling difficulties. Gusts of wind may also need to be taken into account, even if overall wind speeds are below the machine's stated limit.
- Draglines in general have a further reach than that of similarly sized conventional excavators used for excavating or dredging work. However dredging in water requires particular consideration because of such factors as the lack of visibility and weight of excess water. For example, contact with underwater debris or boulders can cause an overload or create instability, or when the bucket is drawn above the water line, excessive water in the bucket may not be able to drain sufficiently which again could increase instability. However, a large amount of fast draining water can result in sediment or material loss from the bucket.
- Dredging operations mean that the work is could be carried out where the machine follows the edge of bank meaning that dredging is undertaken side on to the tracks. In this position however, there can be minimal resistance to movement as the track grousers are ineffective, with a result that a dragline could be pulled towards the bucket and over the edge should the bucket meet a high resistance when dredging.
- Draglines should only operate when they are level both longitudinally (forward/backward) and laterally (sideways). Excavating or dredging when the dragline is not level laterally can place a side loading on the boom or jib. Excessive lateral leaning could cause the dragline to become unstable and overturn as the centre of gravity can exceed safe margins. Effective and efficient operations means that cycle times should be

optimised; however, slewing the upper structure too fast with a loaded bucket can cause higher levels of side stress on the boom.

- Efficient excavating means using the required amount of radius on either side of the hoist rope's vertical position. In general (although this is a topic of debate), too much throw beyond the vertical means that working angles are not conducive to effective bucket loading. The most effective working area is considered to be approximately 15 degrees each side of the vertical position of the hoist rope. Extra stress is also placed on the hoist rope when it is thrown beyond the vertical and this increases proportionally to the throw of the bucket. When excavating in hard ground, the operator needs to be aware that the bucket can move sideways.
- Rigging, pre-use checks or reconfiguring usually requires working at height in order to access the necessary areas of the dragline. Where a portable ladder is being used to reach part of the dragline, it should be secured with at least 3 rungs or at least 1 metre beyond the landing level. Where temporary or inbuilt access ladders are being used, there should be sufficient foot penetration on each rung i.e. the centre of the foot should reach the rung, to provide sufficient foot grip and minimise slips, particularly where access steps have become filled in with mud or other materials.

Stability

Topic scoring information: 3 correct answers required out of 5 questions presented to pass

- Due to the various factors mentioned, draglines have become unstable and overturned, with the usual costly consequences. Effective planning of the ground, working area and other environmental factors must be taken into account before setting up begins. Ground conditions play an important part in stability and should be checked by a suitable and competent person to ensure that the ground can support the bearing pressure applied through each track.
- The bearing pressure applied through each part of each track varies depending on the configuration, the position of the jib or boom and the weight in the bucket being lifted. For example, if the jib or boom is in line with the tracks of the dragline, the bucket is empty and the jib or boom is near to or fully raised, ground bearing pressure is concentrated equally across the rear of the tracks because the counterweight biases weight towards the rear. As the boom is lowered, the bearing pressure shifts towards the front of the tracks. In some cases, when working on soft ground, supporting matting or timber is used as a platform to spread the bearing pressure and create a stable platform, although the dragline can be susceptible to movement as there is minimal grip between the tracks and supporting timber.
- Ground conditions are crucial for maintaining stability of a dragline during operations and the operator needs to take into account changes to the ground. Heavy rain, for example, can weaken the ground and cause instability. Ground conditions must be checked (by a competent person) not only for dragline duties but also when the machine is travelling as the sinking of one of both tracks can cause a dragline to exceed maximum radius or exceed the track width, and an overturn could occur. Working near to or alongside a water course can be hazardous as ground pressure applied through the tracks can cause the side of the bank to collapse Where the machine is being operated with the front of its tracks facing the bank, a forward tilt increases the operating radius, which can cause further instability.
- Travelling a dragline across a slope means that the centre of gravity moves towards the downhill side of the slope, which can cause instability. Travelling with a load in the bucket can increase the risk of instability even if the incline is the same.