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The questions and answers will not be published but factsheets are available for each module to cover the topics.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

Other categories held:	Needs only to book:
Crane/lifting operations supervisor	Appointed person
Singer/Signaller	

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

Planning and regulatory requirements *(Regulatory requirements)*

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

- The role or duties of the appointed person (AP) or lift planner are described within codes of practice such as LOLER 1998. Other guidance such as BS 7121 identifies the responsibilities, attributes and requirements of the role, and what should be taken into account when the planning of lifting operations is undertaken. The AP remains responsible for the execution and safety of the lifting operation although may delegate other duties, although not the responsibility, to other persons such as the crane or lifting operations supervisor.
- For a lifting operation to be carried out efficiently and without incident, the AP needs to seek, analyse, calculate and specify a procedure and detail the method of executing a lifting operation or operations whilst conforming to both good practice and regulatory requirements. They are further expected to relay the information in a clear and coherent manner to the members of the lifting team, via relevant documentation and other forms of instruction. Investigations of lifting operations incidents have shown that a lack of effective planning is a main cause. The aim of this factsheet is to highlight issues that have occurred with lifting operations within the construction and allied sectors, of which the AP should be aware. It further aims to reiterate some of the areas of responsibility for an AP and what they may need to take into account when planning lifting operations.
- A lift plan is normally constructed that, in principle, includes the risk assessment for the operation, a method statement outlining how the risks should be controlled, identification of personnel required, the technical data relating to the crane, loads, accessories and working area, the sequence of operations and actions to be taken in an emergency or where alternative arrangements need to be made.
- The AP needs to consider and stipulate the competencies and skills required based on the required role, and the number and type of personnel needed for each part of a lifting operation. For example, the AP needs to consider and specify that the chosen slinger/signaller has sufficient knowledge of the attaching procedures where specialist lifting accessories are being used. The AP also needs to ensure that the chosen crane supervisor is able to give clear instruction to other members of the lifting team, especially if the AP is not present at the lift. Although the lift plan specifies skills and competencies, it would not normally need to define the fitness levels of an individual – this would be an employer issue.
- In certain circumstances, the slinger/signaller role may be divided amongst various members of the lifting team, each having a defined task. For example, a slinger may connect the load but several signallers may guide it along a travel route if the load is complex, or where specialist lifting equipment is being used. To minimise any incidents such as trapped limbs, the lift plan needs to ensure that the slinger directs initial movements to the crane operator whilst the load is being slung, before handing control over to the designated signaller. The AP must further consider environmental aspects, such as a change in the weather, which can affect the lifting operation in terms of load control, visibility and ground support. Exposure of the lifting team to poor or extreme weather is another factor to consider.
- When specifying the positioning of a crane, other nearby cranes need to be taken into account. On sites where there are several tower cranes working in near proximity to each other, the AP needs to ensure that the paths of each crane's radius do not overlap. If this is not possible, other considerations such as different jib heights or motion limiters need to be considered. Cranes sometimes need to be positioned within confined areas where there is restricted room, particularly when they are smaller cranes or lifting-type plant such as 360 excavators. Where space around the machine is limited, the AP needs to consider trapping points around the slew or travelling area of the machine and specify an exclusion zone to minimise these trapping points if the gap is less than 600 mm.
- The planning of a complex lift where two cranes are lifting a single load needs further considerations with one of the many being that the proportion of the total load being lifted by each crane needs to be accurately identified and a suitable factor of safety specified. A procedure that ensures good co-ordination between each crane operator during the lift should be determined within the lift plan.
- Regulations and guidance relating to lifting operations require that the planner of lifting operations is both experienced and has appropriate knowledge and expertise. As the factors within a lifting operation can vary considerably depending on sector, location and crane type, APs need to know their limitations. If they are

inexperienced in certain aspects, they should seek appropriate guidance accordingly. Because of the varying nature of lifting operations, regulations also require that lifting operations are appropriately supervised, with the definition that the required supervision is proportionate to the risk of the operation.

Lifting equipment and accessories *(Equipment and accessories)*

Topic scoring information: 1 correct answer required out of 3 questions presented to pass

- Lifting accessories (gear) come in a variety of types including chain slings, wire rope slings and fibre-type webbing slings. There is also specialist equipment such as lifting beams. The type of load to be lifted determines the type of accessory used, but each accessory has its limitations and the selection of the incorrect type has caused loads to detach or fall from the accessory when being lifted. For example, although very versatile, the links of a chain sling can be easily damaged if they are used to lift steel beams that have protruding edges. Another example is that a wire rope sling cannot be effectively bent around tight corners and may not grip loads sufficiently.
- Lifting accessories should be marked with the safe working load (SWL) but are also rated by the working load limit (WLL). In terms of definition, the WLL is the maximum load that the accessory can, by design, lift and this never changes whilst the SWL is the maximum load that the accessory can lift under particular service conditions, and this can vary depending on application. The SWL of a pair of slings normally only applies (in general) up to an included angle of 90 degrees and, if this angle is exceeded, the SWL can be greatly reduced. For example, if a two-legged chain sling is lifting a load of 10 tonnes with each leg vertical, the load in each leg is half of the total – in this case, 5 tonnes. If the (included) leg angle is increased beyond 90 degrees, the load in each leg is increased to 10 tonnes. If the accessory was working near to its SWL, it would be overloaded. Where the included angle increases beyond 120 degrees, then in general, the accessory cannot be used and must be substituted for the correct type such as a lifting beam.
- When a multi-legged chain sling is attached to a load, it needs to be specified that the open end of each hook should be facing out or away from the load, which minimises the chance of a hook slipping out of the load's lifting eye. When attaching the master link of a multi-legged chain sling to the hook of a crane, the plan needs to ensure that the master link is large enough and can articulate freely when on the hook. If more than one set of slings is being connected to the hook of a crane, a shackle of sufficient size and load capacity should be specified to prevent damage to the hook and each set of slings.

Lifting and controlling loads *(Working tasks)*

Topic scoring information: 2 correct answers required out of 4 questions presented to pass

- To effectively plan a lifting operation, the maximum rated lift capacity of the crane must be known and any derating, or increases in a factor of safety, considered if particular operating requirements will be encountered. APs need to be aware that the rated capacity of most cranes only applies to freely suspended loads and when the crane is level in all planes. Objects that are embedded in the ground or being removed from a structure can resist planned movement and possibly cause an overload of the crane.
- The AP, as stated earlier, will need to specify the number and type of personnel for each lift. According to regulations, a signaller is required when the lifting equipment/crane operator cannot see the full path of the load, and several signallers should be specified when signaller cannot see the full path of the load.
- When lifting operations occur near other workers or pedestrians, the safe system of work should, wherever possible, stipulate that moving a suspended load above other workers or pedestrians is avoided. Where this is not possible, other measures such as putting netting around a load or additional securing or protection features must be considered.
- All proximity hazards and conditions on site need to be taken into account and a crane's position planned so that is kept well clear of any overhead power lines. Regulatory lifting operations guidance advise that at least 9 metres plus the length of the jib or boom is kept from power lines mounted on wooden pylons and that at least 15 metres plus the length of the jib or boom is kept from power lines mounted on metal pylons.

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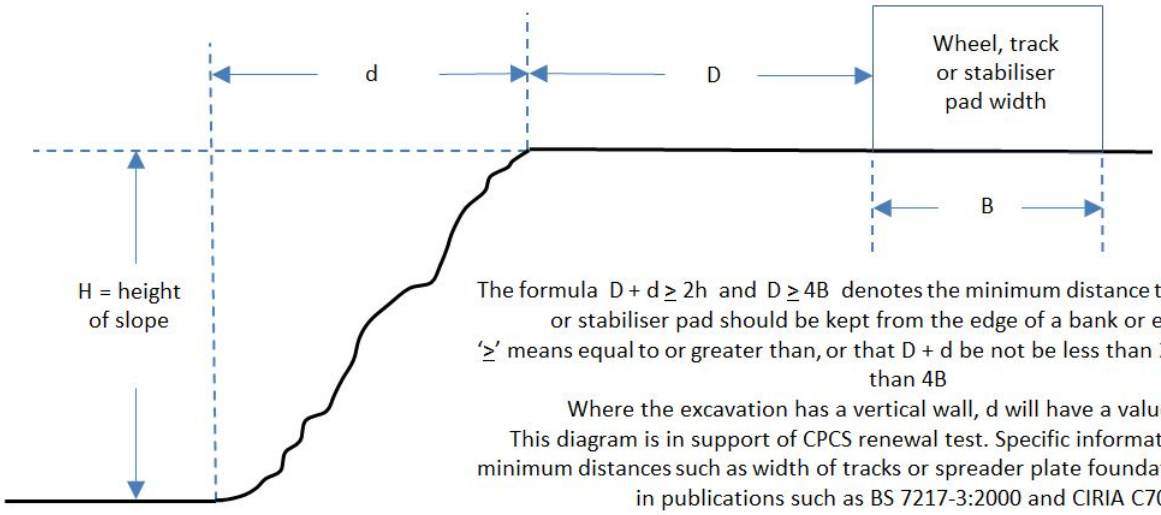
- Where the lifting of persons is being planned, the plan needs to take into account additional considerations such as a reliable evacuation procedure at height in case of an emergency or crane malfunction. A reliable method of communication must be established between the personnel in the cage and the lifting team before lifting commences.

Crane and lifting equipment stability *(Stability)*

Topic scoring information: 1 correct answer required out of 3 questions presented to pass

- Instability and overturns of cranes still occurs for a variety of reasons including changes to operating conditions, unknown or unconsidered factors (such as ground support), insufficient consideration of safety, deviation from the lifting plan or errors in calculations. Proper siting and support of the crane should minimise many of the instability issues. The AP needs to determine the ground loading pressure to be exerted by the crane in all configurations and loads, that the weight of all known loads is determined and calculated correctly, and that the ground can safely support the required pressure. The AP also needs to account for dynamic forces applied by the crane through the ground and determine an appropriate factor of safety accordingly.
- Crane manufacturers now commonly supply exact data on ground-bearing pressures for the various configurations of their cranes but where this is not available, in principle, the formula: (0.75 x gross weight of crane) + gross weight of the load, can be used to calculate the expected weight acting on the ground through each outrigger. Guidance documents, such as CIRIA C703, provide more detailed methods.
- If the crane is to be positioned near to a trench or slope, a minimum distance needs to be kept and stipulated. Guidance (for example BS7121) specifies that the formula used to calculate the minimum distance required is D + d > 2 x H, with D & d combined being the horizontal distance from the foot of the slope to the crane/outrigger and the H the vertical height of the slope. The diagram shown at the end of the factsheet outlines the application of the formula. Stability is also affected when the crane is not level and, although the majority of types are fitted with level indicators, another acceptable method noted in guidance where a level indicator is not fitted is the use of the hoist rope to act as a plumb line
- When travelling to a site, or when even on a site, a mobile-type crane may need to travel or manoeuvre on temporary roadways or haul roads. In some cases this can involve large distances and driving up or down long and steep inclines. In most cases, these types of temporary roads do not have kerbs. Driving too close to the edge of a temporary or minor roadway can and has caused the sides of the roadway to collapse Cranes have been known to overturn when driving too close, with severe injuries received by the driver. The AP needs to ensure that roadways are capable of supporting the weight and size of the crane and that all issues are relayed to the lifting team and crane hirer accordingly.



The formula D + d ≥ 2h and D ≥ 4B denotes the minimum distance that a wheel, track or stabiliser pad should be kept from the edge of a bank or excavation.
'≥' means equal to or greater than, or that D + d be not be less than 2h, and D not less than 4B
Where the excavation has a vertical wall, d will have a value of zero.
This diagram is in support of CPCS renewal test. Specific information relating to minimum distances such as width of tracks or spreader plate foundation can be found in publications such as BS 7217-3:2000 and CIRIA C703