

IMPERIAL COLLEGE LONDON

SOUTH KENSINGTON CAMPUS

DELIVERY AND LOADING GUIDE
FOR SAFE APPLICATION OF MOBILE LIFTING
EQUIPMENT WITHIN THE COLLEGE CAMPUS

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1.0 Introduction

The purpose of this document is to protect the staff, students, visitors and general public at Imperial College London (College), their assets and its environs, during lifting operations involving mobile cranes and tower cranes, by Contractors within the confines of the College. This includes the use of truck mounted lifting equipment, hydraulic access platforms and teleporters.

This specification defines areas within the College where there are restrictions on the use of lifting equipment, and notifications of hazard areas where it is recommended that no equipment lifting takes place or is only allowed to proceed with additional protection.

The College shall ensure that alternative provisions for means of escape in case of fire are provided, where necessary.

The specification does not apply to the loads on to a public highway, except where over College vaults.

The normal contractual obligations of the Contractor and lifting equipment supplier shall not be reduced by this specification and all lifting operations shall comply fully with the relevant legislation.

The Director of Estates Facilities is responsible, on behalf of the College, for agreeing that the lifting operations may take place. The College Appointed Structural Engineer is the person appointed by the College to ensure that the requirements of this document are carried out.

2.0 Imperial College Policy Requirements

2.1 Imperial College Requirements

Imperial College policy is to comply with all current legislation for all lifting operations throughout all campuses. Imperial College also requires all personnel connected with the delivery and lifting operation to be suitably qualified.

2.2 Legislation Governing Lifting Operations

2.2.1 The Health and Safety at Work Act (1974).

2.2.2 Lifting Operations and Lifting Equipment Regulations LOLER.

2.2.3 Construction (Design and Management) Regulations 2015.

2.2.4 The Provision and Use of Work Equipment Regulations (including all amendments and statutory implications). PUWER.

2.3 Imperial College Objectives

The principal objective of Imperial College is to ensure that all lifting operations are carried out in a safe and efficient manner, with minimum disruption to the College Students, Staff and the general public, without increasing the risk to the College Community.

2.4 Imperial College Environmental considerations

- 2.4.1** All engines shall be switched off when not in use, for the purposes of bringing into service, lifting operations or de-rigging of the crane and its associated vehicles. This applies to all engine powered equipment.
- 2.4.2** No vehicle shall be left unattended with the engine running.
- 2.4.3** No vehicle shall have its engine running when not in service

3.0 Roles and Responsibilities

3.1 Imperial College staff

- 3.1.1** Director of Estates Facilities
Final responsibility for agreeing the lift operation and date.
- 3.1.2** Director of Estates Projects
Responsible for all Estates related lifting operations
- 3.1.3** Project Manager
Responsible for ensuring that all the necessary notifications and consents have been obtained prior to the lifting operation. The College Project Manager will pass all the information on to the College Appointed Engineer, for their comments. The College Project Manager can work for either of the Estates Directors. The College Project Manager is responsible for ensuring that the Estates Facilities Director is fully informed in respect of all aspects relating to the specified lifting operation.

The College Project Manager shall ensure that all the products/equipment to be lifted have been checked and passed fit for purpose.

3.2 Imperial College Consultants

- 3.2.1** The Consultants are responsible for ensuring the specified product is fit for purpose. This includes checking the products/ equipment to be lifted. Contact details will be provided to the College Appointed Engineer in case there are any queries to be raised.
- 3.2.2** The College Appointed Engineer for the Lifting operation has to ensure that the College parameters are fully complied with and reports directly to the College's Project Manager, the Director of Estates Facilities and the Head of Health and Safety-Estates Projects.

3.3 Contractor's Staff

- 3.3.1** The Contractor's Site Manager shall ensure that all the necessary documentation and consents have been obtained and sent to the College Project Manager. The Contractor's site manager is responsible for ensuring that the Contractor's Safety Officer has checked all the necessary documentation prior to the College submission.

3.3.2 The Contractor's Safety Officer is responsible for the safety of all site lifting operations.

3.3.3 The Contractor's Site Manager shall ensure that all the requirements for the lifting operation are in place prior to the commencement of the works.

4.0 Procedure for Approval of Contractors Lifting Operations

4.1 Notification

Crane lifts should be discussed at the monthly Campus Co-ordination meeting so that they can be coordinated with any other works on-going around the Campus. Any emergency crane lifts should be discussed and agreed with the Director of Estates Facilities.

4.2 Information to be provided by Imperial College

- a) Issue suitable campus plan showing service tunnels and services where necessary to ensure that Contractor has adequate base information prior to ordering the lifting equipment. This can take the form of a whole campus drawing or local sketch of the area.
- b) The College will provide any additional information in respect of College escape routes, lifting over roofs and traffic management as required.

4.3 Information to be provided by the Lifting Contractor

- a) Define the type of lift, i.e. "Basic, Standard or Complex" (*To BS 7121*) and locate possible operations area.
- b) Provide full details of the total works to be carried out, including the procedure to remove the load from the lifting equipment and safely transport it (if required) to the final location. For example, when an item of equipment has to be passed through an opening into the building, how is it transported to its final resting place?
- c) Provide a full and detailed Method Statement for the complete lifting and handling operations at least 14 days prior to the commencement of the lift. This Method Statement, from the Contractor, will contain the following information:-
 - i. Delivery, Size and Type of equipment to be lifted from initial location to final location, including all secondary handling equipment required.
 - ii. The size and type of lifting equipment to be used.
 - iii. Full details of all the vehicles involved including all deliveries.
 - iv. Equipment size, location, outrigger reactions for all lifting equipment, and the service area required.

- v. Test Certificates for all the lifting equipment to be used during the lifting operations, are to be provided by the lifting operations Contractor prior to the commencement of the erection and use of the lifting equipment on site.
 - vi. Safe working perimeters and distances around each lifting operation to form part of exclusion zones and materials handling zones for the Contractors delivering the goods. This will include all car parking spaces required. Full details, including protective fencing around the exclusion zone, to exclude all non-essential personnel.
 - vii. A list of competent people involved in the lift, together with their competencies, and the name and phone number of the person who will be in charge of the operation.
 - viii. Confirmation that all the necessary consents for the moving of abnormal loads have been applied for in good time.
- d) Define areas of College to form exclusion and working zones for the lifting operations.

4.4 Duties Performed by the Main Contractor

- 1) Define and agree a route for all plant and equipment to enter the College with the Director of Estates Facilities.
- 2) Ensure that no other lifting operations are proposed that may block other areas of Imperial College campus roads at the same time. There are circumstances where more than one lift can be accommodated on the same campus , this is at the discretion of the Director of Estates Facilities.
- 3) Ensure that the Director of Estates Facilities has full knowledge of the lifting equipment and any implications.
- 4) Ensure that all the components to be erected or placed in position are fit for purpose. This includes all structural steelwork, plant and all other equipment.
- 5) Ensure that the College has consented to the lift taking place.
- 6) Ensure that the lifting equipment test certificates and insurance documentation are provided to the College Appointed Engineer prior to commencement of works.
- 7) Ensure that all the lifting operation and the necessary ancillary works are conducted in a safe and efficient manner and in accordance with the method statement.
- 8) Ensure the lifting zone is enclosed with HERAS fencing, 1.8m high.
- 9) Report back to College on completion as necessary.

5.0 Requirements for Campus

5.1 General Paved Areas

5.1.1 Ground Bearing Pressure

The ground bearing pressure underneath the lifting equipment shall not exceed 200kN/m² (2 tons/f²) in tarmac areas, and shall be reduced to 100kN/m² (1 ton/f²) in areas of brick pavers. Areas of York and Concrete paving slabs shall not be used to provide support for outrigger reactions and are excluded to all wheeled traffic, except pushbikes, college service trolleys (catering) etc., and similar lightweight equipment. The use of heavily loaded pallet trucks is prohibited, except in circumstances agreed with the Director of Estates Facilities. The only permitted exception to this is the access route for vehicles delivering to the rear of the Skempton building.

5.1.2 Inspections

Where applicable, i.e. when lifting equipment outrigger is adjacent to walls, building basements and the service tunnels, an inspection shall be carried out by a College Appointed Engineer at least 3 days prior to the lifting equipment arriving on site and any structural defects noted. These notes should be passed to the College and a decision made by the Director of the Estates Facilities as to whether the lift should proceed.

A recommendation for additional temporary propping and safety measures shall be made by the College Appointed Engineer, if necessary.

Upon successful completion of the lift and within three days of the lift taking place, the retaining walls, building basements and the service tunnels shall be re-inspected by the College Appointed Engineer and a report made to the College as required.

5.1.3 Lifting Procedures

On the day of the lift the position and size of spread of pad assemblies shall be checked by the College Appointed Engineer, and no lift shall take place until this check has been carried out. Should the lifting equipment supplier be unable to achieve the specified and agreed spreader plates, the lift shall not take place.

The lifting operations shall be observed by the College Appointed Engineer, to ensure that the lifting equipment positions and routing through the campus are strictly adhered to.

6.0 Campus Guidance Notes

6.1 South Kensington Campus

6.1.1 Access Routes

The materials and lifting equipment shall gain access either from Prince Consort Road or Exhibition Road entrances, whichever provides the more suitable route.

Note – restricted width of Exhibition Road access 3.0m, restricted width of Prince Consort Road gates into Callander Road 2.8m.

There is no access through the Falmouth Gates.

Specific Restrictions for Use of Lifting equipment in Various Areas

6.1.2 Service Tunnels

The following requirements must be observed when planning and using heavy lifting equipment adjacent to and over existing service tunnels.

6.1.2.1 Ground Bearing Pressure over Service Tunnels

The ground bearing pressure underneath the lifting equipment outrigger pad shall not exceed 100kN/m² (1-ton/sq.ft)

6.1.2.2 Inspections of Service Tunnels

When deemed necessary an inspection of the service tunnels shall be carried out by the College Appointed Engineer at least 3 days prior to the lifting equipment arriving on site and any structural defects noted and reported, with recommendations, to the Director of Estates Facilities.

Within 3 days of the lift the College Appointed Engineer shall re-inspect the tunnels

6.1.3 Exclusion Zones

The following areas are to be excluded from all lifting operations:-

- 1) Beit Quad
- 2) Princes Gardens
- 3) Queen's Lawn
- 4) The paved area between Queen's Lawn, College Library and Sherfield Building
- 5) Access through Falmouth Gates is not permitted
- 6) Lifting operations that pass through the trees adjacent to Queen's Lawn are prohibited without the expressed written permission of the Director of Estates Facilities.

NB There are two protected routes for hand operated pallet trucks, as shown on the campus drawing. These are the only approved routes, for pallet truck delivery to Queen's Lawn and Beit Quad.

6.1.4 Basement adjacent to Lifting Area

The existing retaining walls to basements may not have been designed for full HGV loading and it is therefore required to reduce the ground bearing pressure to 100kNm² (1ton f²)

6.1.5 Inspection of Basement Walls

When deemed necessary an inspection of the basement walls shall be carried out by the College Appointed Engineer at least 3 days prior to the lifting equipment arriving on site and any structural defects noted and reported, with recommendations, to the Director of the Estates Facilities.

Within 3 days of the lift, the College Appointed Engineer shall re-inspect the basement walls.

6.1.6 Unsuitable Areas

The paved area between Sherfield Building and Queen's Lawn

The area in the grounds of Eastside and Southside, known as Princes Gardens is unsuitable for the use of mobile lifting equipment. This includes the pavement to the rear of the Princess Gate Buildings.

The area enclosed by Beit Quad.

Please note:

The road in front of Eastside is suitable for the use of mobile lifting equipment.

6.1.7 Noise restrictions

The permitted working times for the area adjacent to Wells Way and Armstrong Road.

Monday to Friday:- 8.00 am – 8.00 pm

Saturdays:- 8.00 am – 6.00 pm

Sundays:- 9.00 am – 1.00 pm.

All lifting operations must finish in time to be clear from the College by 2.00 pm.

The College reserves the right to impose further noise restrictions as necessary (eg during College examinations).

6.1.8 Hazard and Restricted Areas

In certain hazard areas it is recommended that no lifting equipment lift takes place or is allowed to proceed over these areas until such time as further additional protection is provided, e.g. the gas bottle store adjacent to Huxley Building and/or bulk nitrogen stores, electricity substation etc. Refer to Campus map.

7.0 Procedure to be Adopted Prior to Lifting Operations being Approved

7.1 Procurement Specification Amendments

Many items of plant have specified lifting or attachment points where the attachment is provided by the manufacturer. Test certificates for these attachments must be provided prior to the machine being delivered on site and the requirement for this information should be contained within the procurement documentation. Clause for procurement specification *“where attachment points are provide by the equipment manufacturer, test certification and, if necessary, test and design information should be provided prior to the order being placed”*. *The equipment shall be delivered with the necessary certification if the lifting attachments are fixed in position and, if not, the specified lifting attachment shall be provided with current test certification.”*

7.2 Equipment to be Lifted – Information Required.

The maximum weight of the unit to be lifted shall be provided, together with any other lifting requirements, in a timely manner to ensure that the lifting operation on site can be carried out successfully. The required test certification for the lifting attachments shall be provided. Full details of the suspension points shall be provided.

7.3 Location of Lifting Operation

The proposed location for the lifting operation, together with any additional areas that may be required, shall be specified as soon as is practical to the College. This includes obtaining agreement from the College Facilities Director to ensure that the necessary precautions are put in place during the crane lift. These can include managing the College fire route, lifting over lightweight roofing, or any other requirements the College may add.

7.4 College Agreements

The final location for the crane and ancillary traffic will be agreed with the Director of Estates Facilities as soon as is practical. The minimum period of notice for a lifting operation using a mobile crane shall be three weeks

Information to be provided:-

- a) Size and type of crane to be used
- b) The maximum outrigger reaction

- c) The size of spreader to be provided
- d) The number of vehicles in attendance
- e) Are there any supporting operations
- f) The anticipated duration of the lifting operations
- g) Is there a requirement for a truck mounted crane for additional lifts.
- h) The location of the Heras temporary enclosure
- j) The route of the load from pickup to final position

The College will confirm that all the necessary safety procedures have been put in place. This includes the following:-

- a) The access and egress routes for the mobile crane is agreed
- b) The access and egress routes have been agreed for all plant deliveries and removal of redundant equipment.
- c) The risk below the moving load is minimised.
For example, where lifting over glazed roofing, there is nobody underneath. No loads to be left suspended for greater time than is necessary to ensure safe lifting and placing.

7.5 Information to be Provided

During the week before the lift, ensure that those directing the lifting operation are aware of College requirement to see all the normal safety certificates for the crane and its' lifting equipment. The check of the crane safety certificate will be directly related to the chassis number of the crane (This is the hardest element to change. Plant numbers and vehicle registration plates can be moved from machine to machine).

8.0 On the day procedures

8.1 College Requirements

The normal college time restrictions apply. The placing of spreader mats etc, may not rely on the main crane and this can proceed, usually using a truck mounted hydraulic arm with hook, subject to satisfactory test and operator's certificates being available.

8.2 Crane Certification

Before the crane is allowed to proceed to its final location copies of the relevant test certificates shall be provided for verification by the College Appointed Engineer. The College Appointed Engineer shall check all certificates for lifting equipment and competency certification for all those involved in lifting operations.

8.3 Lifting Attachments

Prior to any equipment being lifted, copies of the necessary test certificates shall be provided where attachments or attachment points are provided. This requirement only applies to attachment points. Where the items to be lifted are supported in slings taking the entire load, there is no requirement for additional certification.

8.4 College Representative's Report

At the end of the lift, when the crane has been removed and no damaged to ground apparent, a simple text message shall be sent to both the Facilities and Project Directors as required. Should there be a requirement to report, this will be issued as soon as is practically possible after the event.

8.5 Other Recommendations

There is currently, in the crane procedures guide, a requirement for all lifting operations to be enclosed in Heras fencing. This requirement must be adhered to. College staff and students will enter any other barrier system and this is unacceptable.

9.0 Procedure to be Observed During Lifting Operations

9.1 Safety Barriers

- 9.1.1** Erect and ensure that non-essential personnel exclusion zone is satisfactory .
- 9.1.2** Ensure that no previously agreed "as necessary Means of Escape in case of Fire" routes are blocked.
- 9.1.3** Do not exceed area agreed with the College for the lifting operations.
- 9.1.4** Ensure that all the escape routes and other exits that have an egress, within the lifting operations enclosure, have been locked off by Security.
- 9.1.5** The Security Office must be informed when all lifting operations are complete and the crane is removed.

9.2 Crane

- 9.2.1** Insurance and Rigging Detail
- 9.2.2** Provide details of insurance, safety certificates, etc. for the lifting equipment to be used.
- 9.2.3** Ensure that the position and size outrigger load spreaders are as per the agreed Method Statement and confirmed by the College Appointed Engineer. When this has been confirmed, the agreed lift(s) may take place.

9.3 Acceptance by College

No lifting operation shall take place within any College Campus until the necessary requirements above have been agreed by the College Appointed Engineer.