

 <p>CERN</p>	<p><b>SAFETY CODE</b> <b>CODE DE SÉCURITÉ</b></p>	<p><b>D 1</b> <b>Rev.</b></p>
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# EQUIPEMENTS DE LEVAGE

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# LIFTING EQUIPMENT

Ce code annule et remplace le Code D1 publié en 1988

This code annuls and replaces Code D1 issued in 1988

	<b>CODE DE SECURITE</b> <b>SAFETY CODE</b>	<b>D1</b> <b>Rev.</b>
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Issued by the Director-General

Date of revision: 1996  
Original: French

## LIFTING EQUIPMENT

### 1 LEGAL BASIS

This Code is based on the document SAPOCO/42, 1994 Edition, which defines CERN's safety policy. It is published in application of the Staff Rules and Regulations.

### 2 AIM

The aim of this code is to lay down the rules and norms to be followed in the design, construction, installation, testing, use and maintenance of all **lifting and handling equipment** used on the CERN site.

The generic reference texts (*referred to below using Roman numerals*), are summarised in Annex 1, and comprise:

- the European directives (EEC)
- the construction norms and codes (CEN, ISO, IEC, FEM, NF)
- the CERN regulations (safety codes and instructions).

### 3 SCOPE

This code applies throughout all CERN sites :

- **to all persons** under the authority of the Director-General (including contractors' personnel and experimental physics groups),
- **to all lifting and handling equipment and installations** (including those belonging to outside contractors and experimental physics groups).

## 4 GENERAL DEFINITIONS

This code concerns the following equipment:

- **Lifting equipment:**

All equipment such as jib cranes, overhead travelling cranes, gantry cranes, hoists, pallet trucks, fork-lift trucks, lifting platforms, personnel elevators, disabled persons' elevators, hoppers, winches, jacks, etc., as well as the LEP monorail train.

- **Lifting and handling accessories:**

All components or items of equipment for attaching loads, such as shackles, eyebolts, eyenuts, slings, chains, cables, ropes, hooks, rings and lifting beams, including those for moving such loads in a horizontal plane.

- **Passenger and goods lifts:**

All permanently installed guided lifting appliances stopping at defined levels for transporting people and goods in an enclosed cabin.

*NB: A flow chart for the use of this code, with reference to its various chapters and the applicable statutory texts, is given in Annex 2.*

## 5 RULES TO BE RESPECTED UPON ACQUISITION

This chapter concerns lifting equipment purchased or hired by CERN.

### 5.1 STATUTORY TEXTS

#### 5.1.1 Lifting equipment and accessories

Two cases should be considered upon the purchase of lifting equipment or accessories: whether the equipment is new or second-hand.

##### 5.1.1.1 New equipment

All items of equipment commissioned after 1 January 1993 shall be considered as "new".

The applicable reference texts are:

- European Directive 89/392/EEC dated 14 June 1989 amended by Directives 91/368/EEC, 93/44/EEC and 93/68/EEC [I];
- CERN regulations:
  - a) Safety instructions IS 23 (cable insulation) and IS 41 (plastic materials) [XII, XIII] shall be strictly applied.

- b) The identification system for cables and electrical conductors as well as the safety colours and signs to be respected are defined in safety code A3 [XIV].
- c) Electrical installations shall be designed and maintained in conformity with safety code C1 [XV].
- d) The pressure vessels and piping for pneumatic and hydraulic jib cranes and overhead travelling cranes shall be designed to comply with safety code D2 [XVI].
- e) The control boxes for lifting equipment shall be yellow.
- f) For remote-controlled lifting equipment and accessories, the direction of the movements (travel, traverse, etc.) shall be clearly indicated on the structure and be visible from the operator's position.
- g) All indications and markings on the equipment and the instruction documents shall be in French and English.

#### 5.1.1.2 Second-hand equipment

All equipment which has been in use before 1 January 1993 shall comply with the reference texts applicable to these cases, i.e. the European Directive 89/655/EEC dated 30 November 1989, amended by Directive 95/63/EEC [II].

#### 5.1.2 **Passenger and goods lifts**

The applicable regulations are as follows:

- Directive 95/16/EEC of the European Parliament and Council dated 29 June 1995 [III].
- The following norms issued by CEN (European Committee for Normalization):
  - \* EN 81 part 1 of 1985 [VI]
  - \* EN 81 part 2 of 1987 [VII]
- The following norms issued by AFNOR (French Association for Normalization):
  - \* NFP 82-211 of 1987 [VIII]
  - \* NFP 82-212 of 1987 [IX]
  - \* NFP 82-311 of 1988 [X]
  - \* NFP 82-312 of 1988 [XI]

*NB : CERN accepts the national norms which define safety rules of a level at least equivalent to those listed above.*

### 5.1.3 Special equipment

For special equipment the reference texts shall be defined by TIS and take into account the applicable European Directives in the absence of national norms.

## 5.2 PURCHASE REQUEST

For the procurement of any lifting equipment or accessory, the purchase request (DAI or other) must be approved by TIS.

## 5.3 CERTIFICATES AND DECLARATIONS OF CONFORMITY

Lifting equipment and accessories (new or second-hand) shall be supplied with a declaration of conformity or a declaration of incorporation.

For passenger and goods lifts to be installed in compliance with Directive 95/16/EEC [III], the installer shall supply a declaration of conformity.

Certificates and declarations prepared and submitted by manufacturers shall be in French or English.

## 6. RULES FOR DESIGN AND CONSTRUCTION

This chapter concerns lifting equipment studied and designed by CERN.

### 6.1 STATUTORY TEXTS

The applicable reference texts are:

- the European Directive 89/392/EEC dated 14 June 1989 amended by Directives 91/368/EEC, 93/44/EEC and 93/68/EEC [I],
- the harmonised European norms,
- in the absence of harmonised European norms, ISO or national norms,
- the rules of the European Handling Federation (FEM), [XVII],
- the "Recommendations for the installation of a control system actuated by radio on electric hoists and travelling and gantry cranes" issued by the French Handling Union (SFM) [XVIII],
- the CERN regulations: see section 5.1.1.1.

### 6.2 DESIGN FILE

All projects for the design and construction of lifting equipment and accessories to be used on the site shall be submitted to TIS for approval before the price inquiry starts. To this end, the technical officer in charge shall prepare a **design file** based on the norms in force, which shall contain:

- the technical specifications,
- the operating conditions and procedures,
- the design memoranda,
- a complete set of drawings,
- the safety inspections and checks as well as the planned quality control inspections.

## 7 COMMISSIONING

### 7.1 STATUTORY TEXTS

#### 7.1.1 Lifting equipment and accessories

The applicable reference text is the French Ministerial Order (AM) dated 9 June 1993 [V] laying down the conditions for checking equipment used for lifting loads, work stations or people.

#### 7.1.2 Passenger and goods lifts

The applicable reference texts comprise the following norms:

- EN 81 part 1 of 1985 [VI]
- EN 81 part 2 of 1987 [VII]
- NFP 82-211 of 1987 [VIII]
- NFP 82-212 of 1987 [IX]
- NFP 82-311 of 1988 [X]
- NFP 82-312 of 1988 [XI]

### 7.2 REFERENCE FILE

All non-standard lifting equipment used at CERN shall have a technical reference file containing:

- a) - name and address of the manufacturer,
  - identification of the equipment,
  - description of the operating modes,
  - instruction manual as defined in Directive 89/392 EEC [I],
  - risk analysis for the prevention of special dangers associated with the equipment,
- b) - design calculations,
  - characteristics of components and accessories,
  - set of final drawings and diagrams:
    - overall drawing,
    - structural drawing with dimensions and nature of materials used,
    - layout drawing of control devices,
    - layout drawing of protection devices,
    - diagrams of control and power circuits (electricity, fluids).

- c) - certificates of compliance with the specifications (test certificate, periodic inspection certificate, component approval certificate, etc.)
- list of norms used in the design and construction.

The technical file shall be in French or English.

**THIS FILE SHALL BE HELD BY TIS FOR AS LONG AS THE EQUIPMENT IS USED AT CERN.**

### **7.3 INSPECTIONS AND TESTS PRIOR TO COMMISSIONING AT CERN**

The table in Annex 3 summarises the procedure to be followed.

No new lifting equipment may be commissioned on the CERN site without authorisation and acceptance inspection (with test) by TIS.

#### **7.3.1 Lifting equipment and accessories**

##### 7.3.1.1 Commissioning

**Lifting equipment ordered from an outside supplier shall be delivered with the «CE» declaration of conformity, together with, if necessary, test certificates issued by an official body in the country where the lifting equipment was built.**

The acceptance inspection shall be organised by the division which ordered the equipment. A representative of the division responsible for maintaining the equipment and a representative of TIS must be present. TIS shall draw up an acceptance report to which it shall assign an identification number.

##### 7.3.1.2 Re-use

A re-use inspection with tests, to be decided by TIS, shall be performed in the following cases:

- change of the place or conditions of use,
- after dismantling and subsequent re-assembly of the equipment,
- after any replacement, repair or major modification affecting vital components,
- after any accident or incident.

#### **7.3.2 Passenger and goods lifts**

##### 7.3.2.1 Commissioning

The pre-commissioning inspections are defined in Annex D of the norms EN81 parts 1 and 2 [VI, VII].

### 7.3.2.2 Re-use

The inspections after a major modification or an accident or incident are defined in Annex E of the norms EN 81 part 1 and 2 [VI, VII].

### 7.3.3 Safety factors:

The safety factors to be applied are those defined by the manufacturer's instruction manual or arising from the regulations applied for its design. By default, the factors shall be (ref. [I]):

For the static test:

- 1.5 for equipment driven by human power applied directly,
- 1.25 for other equipment.

For the dynamic test:

- 1.1 for all equipment.

## 8. OPERATION

### 8.1 STATUTORY TEXTS

#### 8.1.1 Lifting equipment and accessories

The applicable reference text is the French Ministerial Order (AM) dated 9 June 1993 [V].

*NB: It is forbidden to use lifting equipment for any purpose other than lifting and handling, except with the prior agreement of TIS, which shall satisfy itself that such use is possible and that all the appropriate safety measures are being taken.*

#### 8.1.2 Passenger and goods lifts

The applicable reference text is the amended French Decree dated 10 July 1913, article 11f [IV].

### 8.2 PERIODIC INSPECTIONS

The lifting equipment and accessories, passenger and goods lifts, and their safety systems shall be inspected by TIS with the periodicity defined in the table below:



EQUIPMENT	INTERVAL
Cables Personnel elevators, unless they are driven directly by human power	every 6 months
Overhead travelling cranes Hoists, gantry cranes Lifting platforms Personnel elevators, cranes LEP monorail train Lifting accessories Passenger and goods lifts	every 12 months
Pallet trucks	every 24 months

TIS shall draw up an inspection report to be forwarded to the division responsible for the maintenance and the TSO of the building in question.

### 8.3 MAINTENANCE

The division responsible for the maintenance shall keep a logbook concerning all the lifting equipment and accessories, passenger and goods lifts used at CERN, in which all maintenance and/or modification operations shall be recorded.

### 8.4 MODIFICATION OR TRANSFER OF INSTALLATIONS OR EQUIPMENT

Any plans to alter or transfer lifting equipment and accessories or passenger and goods lifts shall require the prior approval of TIS. The drawings and diagrams shall be kept according to the same provisions as those imposed for the reference file (see 7.2 and 7.3.1.2).

### 8.5 OPERATOR TRAINING

Any personnel assigned to use on the CERN site lifting equipment such as overhead travelling cranes, fork-lift trucks and the LEP monorail train, even occasionally, shall be duly authorised:

- a) Full-time drivers and sling operators shall hold certificates of professional competence issued by a training body approved by CERN.

- b) Occasional users (CERN personnel, outside contractors, experimentalists) may obtain a restricted authorisation, granted by TIS, allowing them to operate overhead travelling cranes without cabins up to a capacity of 20t after successfully completing a training course organized by TIS. Operators of personnel elevator trucks which carry their operator shall undergo a medical examination by the CERN Medical Service.

TIS may suspend the authorisation following an accident, incident or any manoeuvres putting people or equipment at risk. In such cases, the course and examination shall be taken again.

## **8.6 INCIDENTS OR ACCIDENTS**

All incidents and accidents shall be reported to TIS which shall take the necessary measures (see CERN safety code A2).

## **8.7 SHUTTING DOWN**

TIS shall always be informed when any piece of lifting equipment is taken out of service.

## GLOSSARY

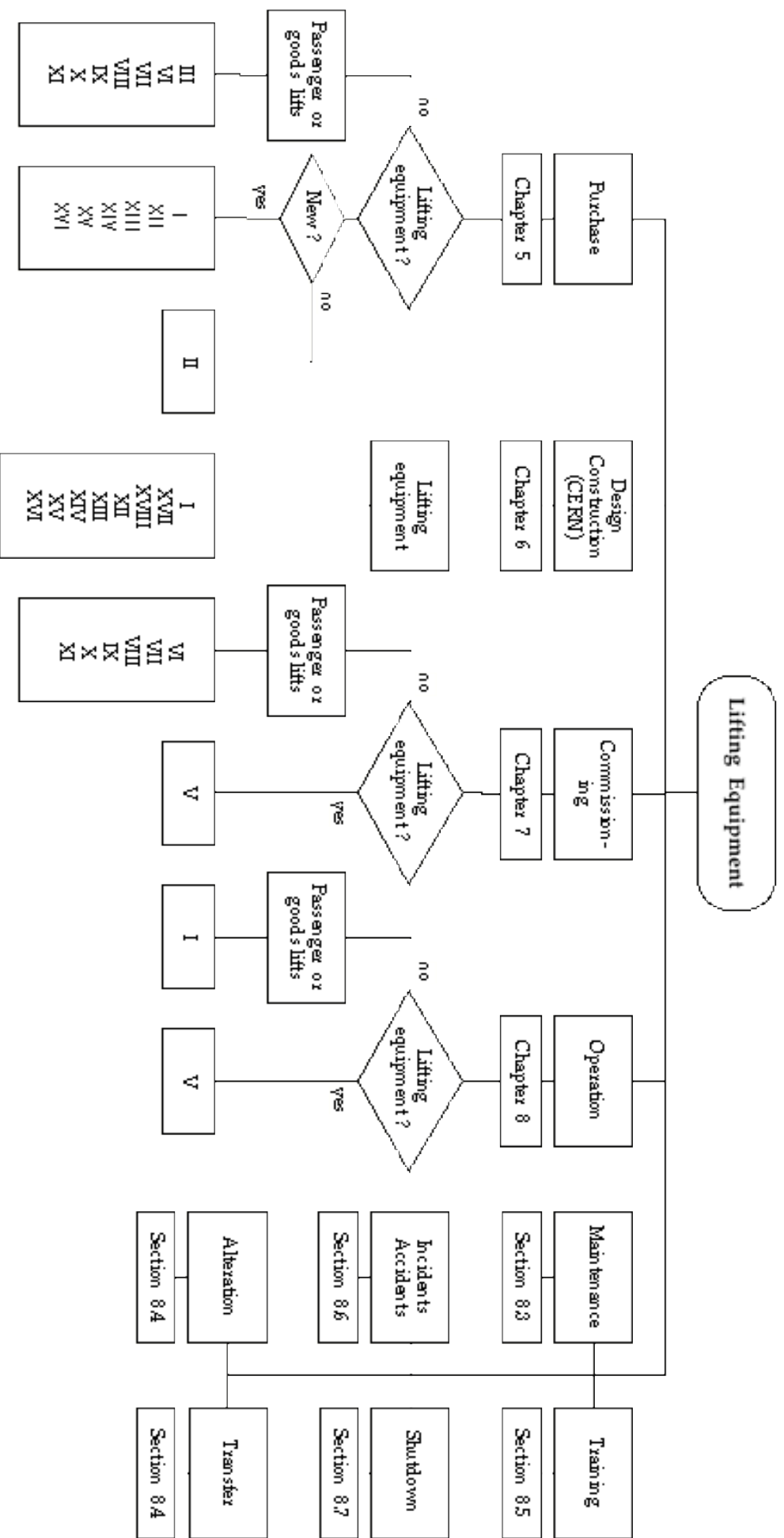
AFNOR	= Association Française de Normalisation (French Association for Normalization)
AM	= Arrêté Ministériel (Ministerial Order)
EEC	= European Economic Community
IEC	= International Electrotechnical Commission
CEN	= Comité Européen de Normalisation (European Committee for Normalization)
DAI	= Demande d'Achat Interne (Internal Purchase Request) (CERN)
FEM	= Fédération Européenne de Manutention (European Handling Federation)
ISO	= International Standardisation Organisation
NF	= Normes Françaises (French Norms)
SAPOCO	= Safety Policy Committee (CERN)
SFM	= Syndicat Français de la Manutention (French Handling Union)
TIS	= Technical Inspection and Safety Division (CERN)
TSO	= Territorial Safety Officer

Table of reference text codes

Type of text	Title of reference document	Code
<b>European Directives</b>	European Directive 89/392/EEC dated 14 June 1989 amended by Directives 91/368/EEC, 93/44/EEC and 93/68/EEC, on the convergence of the legislation of the Member States relating to machinery	I
	European Directive 89/655/EEC dated 30 November 1989 amended by Directive 95/63/EEC on the minimum safety and health requirements for the use of work equipment by workers at work	II
	Directive 95/16/EEC dated 29 June 1995 of the European Parliament and Council on the convergence of the legislation of the Member States relating to lifts	III
<b>French Decree</b>	French Decree dated 10 July 1913 amended - article 11f	IV
<b>French Ministerial Order</b>	Order of the French Employment Ministry dated 9 June 1993 defining the conditions of inspection of work equipment used for lifting loads, workstations or personnel	V
<b>European norms</b>	Norm EN 81 part 1 of 1985 Safety rules for the construction and installation of lifts - electric lifts.	VI
	Norm EN 81 part 2 of 1987 Safety rules for the construction and installation of lifts - hydraulic lifts.	VII
<b>French standards</b>	Norm NFP 82-211 of 1987 Safety rules for the construction and installation of electric lifts in existing buildings.	VIII
	Norm NFP 82-212 of 1987 Safety rules for the construction and installation of electric lifts. Provisions applicable in cases of major alterations.	IX
	Norm NFP 82-311 of 1988 Safety rules for the construction and installation of hydraulic lifts in existing building.	X
	Norm NFP 82-312 of 1988 Safety rules for the construction and installation of hydraulic lifts - Provisions applicable in cases of major alterations.	XI

<b>CERN Rules</b>	Safety instruction IS 23, criteria and standard test methods for the selection of electric cables, wires and insulated parts with respect to fire safety and radiation resistance	<b>XII</b>
	Safety instruction IS 41, the use of plastic and other non-metallic materials at CERN with respect to fire safety and radiation resistance	<b>XIII</b>
	Safety code A3, safety colours and safety signs	<b>XIV</b>
	Safety code C1 on electrical safety	<b>XV</b>
	Safety code D2, pressure vessels and pressurised pipelines.	<b>XVI</b>
<b>Miscellaneous documents</b>	Heavy lifting and handling equipment Rules for the design of lifting equipment (F.E.M. 1.001)	<b>XVII</b>
	Recommendations for the installation of a control system actuated by radio on electric hoists and travelling and gantry cranes, issued by the French Handling Union	<b>XVIII</b>

The above texts are available for consultation at the TIS Commission



\* Generic reference texts (see Annex 1)

Annex 2  
Flow chart Code D1

**Provisions to be complied with  
when commissioning (X) or re-using (•) lifting equipment**

	CHECKS				
	Correct usage inspection	Inspection for wear and tear	Operating test	Tests	
				static	dynamic
<b>NEW OR SECOND-HAND PURCHASED EQUIPMENT</b>					
Equipment (general)	X •	•	X •	X •	X •
Accessories *	X •	•		X •	
<b>HIRED EQUIPMENT</b>					
Equipment and accessories * which have been tested and checked at regular intervals	X	X			
Equipment which has not been checked at regular intervals	X	X	X	X	X
Accessories * which have not been checked at regular intervals	X	X		X	

\* Shackles and slings are not included; they only undergo inspection for wear and tear