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मानक

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“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

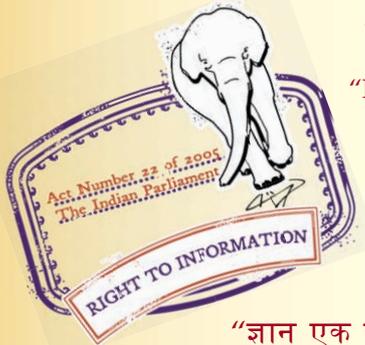
“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 13416-5 (1994): Recommendations for preventive measures against hazards at workplaces, Part 5: Fire protection [CED 29: Construction Management including safety in Construction]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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भारतीय मानक
कार्यस्थलों पर खतरों के विरुद्ध एहतियाती
उपाय — सिफारिशें

भाग 5 आग से सुरक्षा

Indian Standard

PREVENTIVE MEASURES AGAINST
HAZARDS AT WORKPLACES —
RECOMMENDATIONS

PART 5 FIRE PROTECTION

UDC 699'81 : 658'382'3



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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

FOREWORD

This Indian Standard (Part 5) was adopted by the Bureau of Indian Standards, after the draft finalized by the Safety in Construction Sectional Committee had been approved by the Civil Engineering Division Council.

Construction of buildings, factories, bridges, flyovers, dams, etc or major alterations of the same are inherently hazardous regardless of the type of construction. Fire safety and protection techniques at construction workplaces have to be based on the fire behaviours and characteristics of different construction materials and structural elements at workplaces. The nature of job must also be taken into consideration for assuming the extent of hazards and then methods should be devised by which the hazards could be minimised.

Construction activities can be greatly improved from the fire prevention and fire protection point of view by advance planning and by establishing project responsibility. This standard has, therefore, been formulated to lay down the measures which will provide reasonably achievable degree of safety from fire at different construction workplaces. In addition, reference may also be made to Part IV on Fire Protection, National Building Code of India, 1983.

The composition of the technical committee responsible for the formulation of this standard is given at Annex A.

Indian Standard

PREVENTIVE MEASURES AGAINST HAZARDS AT WORKPLACES — RECOMMENDATIONS

PART 5 FIRE PROTECTION**1 SCOPE**

This standard (Part 5) lays down the essential requirements for fire safety during construction or alteration of buildings, factories, etc.

2 REFERENCES

The following Indian Standards are necessary adjuncts to this standard:

<i>IS No.</i>	<i>Title</i>
1646 : 1982	Code of practice for fire safety of buildings (general): Electrical installation (<i>first revision</i>)
2190 : 1979	Code of practice for selection, installation and maintenance of portable first-aid fire extinguishers (<i>second revision</i>)
12349 : 1988	Fire protection — Safety sign

3 CAUSES OF FIRE HAZARDS AT CONSTRUCTION SITES

At any construction workplace fire hazards may take place due to the following:

- a) Gas cutting and welding,
- b) Poorly installed temporary wiring,
- c) Defective heating appliances,
- d) Careless storage and handling of flammables, and
- e) Careless smoking.

4 BASIC CONSIDERATIONS (SITE PREPARATION)

4.1 The construction site, should be clear of any vegetation and debris prior to the start of construction.

4.2 Temporary buildings to house offices, canteen, shops and supplies are normally present at any large construction site and often they are grouped together. A fire in one can easily spread to the other and result in the destruction of all or many of them. A canteen building or any other unit being source

of fuel should, therefore, be located sufficiently away from other units.

4.3 The construction site should be secured by a properly constructed fence.

4.4 Materials and equipments stored in store houses, sheds or in open yards should be subdivided into fire sections having sufficient fire breaks.

4.4.1 Inflammable liquids, gas cylinders and explosive substances should be stored separately at a distance not less than 15 m from buildings, plants and stores. For storing of explosive substances the existing regulations of Indian Explosives Act shall be followed.

4.5 Combustible materials like saw dust, wood shavings and packing materials should be marked clearly and stored separately.

4.6 Stairs should be kept free and not to be used as storage space.

4.7 Aisles of sufficient width should be provided for easy passage of people during an emergency.

4.8 Exit paths should be clearly identified and the minimum width of exit paths should be 1.5 m.

4.9 Good house keeping like orderly storage, cleaning of the site and regular removal of packing materials should be ensured.

4.10 At nights Hurricane Lamps with red coloured paper should be displayed at proper location to ward off any accident.

5 CONTROL OF HAZARDOUS OPERATION

5.1 All possible steps should be taken to have electrical connections and distribution through proper terminals.

Electrical wirings should be either PVC sheathed conductors or vulcanized rubber cables. All joints should be made in porcelain insulated conductors and the wiring should not be permitted to trail on the floor. No part of the electrical circuit should be

laid within 150 mm of any combustible material. All electrical installations should be as per the requirements laid down in IS 1646 :1982 and National Electrical Code, 1984.

5.2 Open flames, welding and cutting operations, wherever necessary, should be carried out with stringent precautions and under proper supervision. All combustible materials lying around should be removed or covered with wet gunny bags, tin sheets, etc, as welding sparks can fly up to 10 m. After completion of such work the area should be inspected.

5.3 Storing, dispensing and usage of flammable liquids and disposal of rags soaked with paints, kerosene and other flammable liquids should be done properly. For this, the provisions given in 5.3.1 to 5.3.4 should be followed.

5.3.1 *Storage of Inflammable Liquids*

In case of storage in open space, the storage area should be fenced off with barbed wire and covered against dust and weather by a non-flammable covering like asbestos cement sheet.

In case of storage in confined spaces, the storage should be done in separate lockable room protected against danger from open electric sparks, cutting and welding sparks, open flames and smoking.

5.3.2 *Measuring and Dispensing of Flammable Liquids*

Any spillage during measurement and dispensing should be caught in large leak-proof tray or pan.

5.3.3 *Usage of Flammable Liquids*

Only such amounts of flammable liquids should be issued as may be required for immediate use. Cans for carrying flammable liquids should be leak proof and properly stoppered.

5.3.4 Rags soaked in paints, kerosene and other flammable liquids should be disposed off daily under supervision. Large quantities of such rags should not be allowed to accumulate where there is danger from sparks or in confined spaces.

5.4 Combustible scrap and other construction debris should be disposed off from the premises regularly. If scrap is to be burnt, the burning site should be specified and located at a distance not less than 12 m outside the construction site and away from combustible materials.

5.5 Use of tar kettles involves burning of fuels, heating of combustible materials and possible exposure of combustible construction. Kettles should be located outside the buildings and should never be placed on a wooden roof. Roofing mops soaked

with tar are susceptible to spontaneous ignition and should not be let inside a building or near combustible materials.

5.6 If use of temporary electrical installations and insulations, is unavoidable, it should be ensured that these are properly guarded against the hazards of mechanical injury from construction equipment.

5.7 Gasoline powered fixed equipment should be located in such a way that exhausts are not directed towards combustible materials. Mobile equipment should be refueled and stored outside the building.

5.8 'No Smoking' signs should be displayed at conspicuous locations and should be enforced. Fire protection safety signs as per IS 12349:1988 may be used for display at appropriate places.

6 PROTECTION

6.1 Adequate number of appropriate type fire extinguishers should be placed near vulnerable places which are easily accessible. Guidelines given in IS 2190 : 1979 and Part IV of National Building Code of India, 1983 should be followed for the purpose.

6.2 Recharging of fire extinguishers and their proper maintenance should be ensured at prescribed time as per IS 2190 : 1979.

6.3 Supervisors and workmen at the site should be trained in the use of first aid fire fighting equipment provided at site (see also Part IV of National Building Code of India, 1983).

6.4 Water supply for fire fighting purpose should be provided at the construction site. This may be in the form of static water tank of adequate capacity or a hydrant line with adequate water pressure at all outlet points as per the details given in Part IV of National Building Code of India, 1983.

6.5 Sufficient number of fire hoses with branch pipes should be provided at the site so that fire can be controlled till the arrival of the fire brigade.

6.6 Telephone number of local fire brigade should be prominently displayed near each telephone provided at construction site.

6.7 Watch and ward services should be provided at construction sites during holidays and nights.

6.8 Approach roads for fire fighting should be planned, properly maintained and kept free from blockage. Width of approach road should be not less than 5 m to facilitate fire fighting operations.

6.9 Emergency plan and fire order specifying the individual responsibility in the event of fire should

be formulated and mock drills should be practised periodically in case of large and important construction sites to ensure upkeep and efficiency of fire fighting appliances.

6.10 A site engineer should be assigned with the specific responsibilities of ensuring compliance with fire safety provisions by contractors and also of coordinating with fire services and other agencies concerned with fire safety.

6.11 Periodical inspection should be carried out to identify any hazard and proper records

maintained and follow up action taken. Guidelines given in IS 2190 : 1979 should also be followed for the purpose.

6.12 Evaluation facilities and fire exits should be provided at all locations susceptible to fire hazards.

6.13 When space does not permit adequate clearance between heating facilities and combustible materials, an appropriate fire proof barrier should be installed.

ANNEX A
(Foreword)

COMMITTEE COMPOSITION

Safety in Construction Sectional Committee, CED 45

<i>Chairman</i>	<i>Representing</i>
MAJ GEN S. N. BOURI	Engineer-in Chief's Branch, Army Headquarters, New Delhi
<i>Members</i>	
SHRI K. S. S. AJJAN	National Thermal Power Corporation, New Delhi
SHRI A. B. LAL (<i>Alternate</i>)	
SHRI G. S. CHANDPURI	Central Water Commission, New Delhi
SHRI D. S. KHANGURA (<i>Alternate</i>)	
CHIEF ENGINEER (Training)	Central Public Works Department, New Delhi
SUPERINTENDING ENGINEER (Training) (<i>Alternate</i>)	
MAJ DALBIR SINGH	Builder's Association of India, Bombay
SHRI VIKRAM KUMAR (<i>Alternate</i>)	
DEPUTY DIRECTOR (B&S)	Ministry of Railways (RDSO), Lucknow
ASSISTANT DESIGN ENGINEER (B&S) (<i>Alternate</i>)	
SHRI P. G. DEVADAS	Acrow India Ltd, Bombay
SHRI P. K. DUTTA	Ministry of Surface Transport (Roads Wing), New Delhi
SHRI A. P. BAHADUR (<i>Alternate</i>)	
FIRE ADVISER	Ministry of Home Affairs (Fire Services), New Delhi
DEPUTY FIRE ADVISER (<i>Alternate</i>)	
SHRI V. K. JAIN	Steel Authority of India Ltd, New Delhi
DR A. K. PANDA (<i>Alternate</i>)	
DR J. L. JETHWA	Central Mining Research Station, Dhanbad
SHRI M. K. VERMAN (<i>Alternate</i>)	
SHRI V. L. KATHANA	Ministry of Labour (DGFASLI), Bombay
SHRI U. B. PARELKAR (<i>Alternate</i>)	
SHRI B. B. KUMAR	National Buildings Construction Corporation Ltd, New Delhi
SHRI J. L. MAHAJAN	Geological Survey of India, Calcutta
SHRI V. K. KASLIWAL (<i>Alternate</i>)	
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SHRI R. P. CHATURVEDI (<i>Alternate</i>)	
SHRI J. P. MITAL	The Institution of Engineer (India), Calcutta
SHRI A. C. NIRWANI	Hindustan Construction Co Ltd, Bombay
SHRI A. K. KHANNA (<i>Alternate</i>)	
SHRI UMAKANT B. PARELKAR	The Indian Institute of Architects, Bombay
SHRI A. L. CHHATRE (<i>Alternate</i>)	
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SHRI J. VENKATARAMAN,	Director General, BIS (<i>Ex-officio Member</i>)
Director (Civ Engg)	
	<i>Member Secretary</i>
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