

SECTION 3

SAFE DISTANCE REQUIREMENTS BETWEEN CONDUCTORS AND BUILDINGS (AND OTHER STRUCTURES)

3.1 GENERAL

- 3.1.1 This section sets safe distance requirements for the construction of buildings and other structures near existing conductors, to prevent inadvertent contact with or close approach to conductors. At higher voltages, contact may be made via a power discharge across the gap.
- 3.1.2 This section also sets safe distance requirements for the location and construction of conductors near existing buildings and other structures.
- 3.1.3 The construction of buildings, scaffolding and other structures shall be in accordance with the Building Code.
- 3.1.4 This section does not apply to telecommunications lines.

3.2 PROCESS FOR ESTABLISHING SAFE DISTANCES

- 3.2.1 Prior to any planned construction, the following process must be undertaken to comply with the Code. The landowner/ building owner shall:
 - 3.2.1.1 Establish, if necessary with the assistance of the overhead electric line owner, whether the proposed building/structure is at a greater distance from the conductor than the recommended distances for new buildings from conductors under normal conditions specified in Table 2.
 - 3.2.1.2 If the proposed building/structure is at a greater distance, then no further action is required by the building owner to comply with this section of the Code with regard to conductor distances.
 - 3.2.1.3 If the proposed building/structure does not (or may not) comply with the requirements of Table 2, then the overhead electric line owner shall be consulted. A specific engineering study must be carried out by a competent person, to establish actual distances in accordance with the requirements of Table 3 (refer section 3.3). Table 3 sets out the minimum safe distances (which are closer than those specified in Table 2) under worst case conditions.
 - 3.2.1.4 Based on the outcome of the engineering study, which shall be provided by the landowner/building owner, the overhead electric line owner will advise whether:-
 - (i) the proposed building/structure complies with Table 3 and construction can proceed without restriction; or
 - (ii) temporary arrangements during building construction need to be made, with the written agreement of the overhead electric line owner, to restrain conductor movement or to provide suitable insulation that will allow closer approach to conductors than those specified in Table 2. As part of the written agreement, the overhead electric line owner may prescribe reasonable conditions for the temporary arrangements; or
 - (iii) the proposed building/structure does not comply with Table 3 requirements, and therefore construction is prohibited.
- 3.2.2 For any overhead electric line owner planning to build a new conductor near to an existing building, a similar process to that set out in clause 3.2.1 must be followed, the costs of any

necessary engineering study being borne by the line owner.

3.3 SAFE DISTANCES FROM CONDUCTORS WITHOUT ENGINEERING ADVICE

3.3.1 Table 2 sets out the safe distances from conductors under normal conditions without engineering advice for conductor spans up to 375 m with supporting structures at equal elevation.

TABLE 2 SAFE DISTANCES FROM CONDUCTORS WITHOUT ENGINEERING ADVICE

Circuit voltage	Maximum span length (m)	Minimum distance beneath conductors under normal conditions (m)	Minimum distance to the side of conductors under normal conditions (m)
Not exceeding 1 kV	50	4	3.5
Exceeding 1 kV but not exceeding 11kV	80	5.5	5
Exceeding 11 kV but not exceeding 33 kV	125	7	8.5
Exceeding 33 kV but not exceeding 110 kV	125	7.5	9.5
Exceeding 110 kV but not exceeding 220 kV	125	8.5	11
275 kV d.c. & 350 kV d.c.	125	8.5	7.5
Not exceeding 33 kV	250	8	12
Exceeding 33 kV but not exceeding 110 kV	250	8.5	12.5
Exceeding 110 kV but not exceeding 220 kV	250	10	14
275 kV d.c. & 350 kV d.c.	250	10	11
Not exceeding 33 kV	375	9.5	20.5
Exceeding 33 kV but not exceeding 110 kV	375	10	21
Exceeding 110 kV but not exceeding 220 kV	375	11	22.5
275 kV d.c. & 350 kV d.c.	375	10.5	18
For all other spans		Engineering advice required	

(voltages are a.c. except where specified as d.c.)

NOTES

- Observance of potential conductor motion is required to ensure safe distances during construction.
- Where supporting structures are not located on equal elevations, a specific engineering study may be required to ensure distances are in accordance with Table 3.

3.4 MINIMUM SAFE DISTANCES OF CONDUCTORS FROM BUILDINGS AND OTHER STRUCTURES WITH SPECIFIC ENGINEERING ADVICE

- 3.4.1 Table 3 sets out the minimum safe distance of distances for conductors from buildings and other structures where a detailed engineering assessment has been carried out.
- 3.4.2 The minimum safe distances from a conductor of an overhead electric line to any structure, building or line support (*other than a support for the line under consideration or any line crossing the line under consideration*) shall not be less than those specified in Table 3.
- 3.4.3 The Table 3 distances do not apply to insulated conductors or cables supported along the façade of a structure or building.
- 3.4.4 Figures 3 and 4 illustrate the application of the Table 3 to a particular building. The letters A to D refer to the distances A to D as set out in Table 3.
- 3.4.5 The distances specified in A and B of Table 3 shall also be maintained above an imaginary horizontal line extending outward for the distance specified in C.
- 3.4.6 For Figure 4, the greater distance of either A, or B (from Table 3) plus the height of the balcony, shall apply, as this latter calculation may result in a distance greater than A.

FIGURES 3 AND 4 BUILDING ELEVATION AND BALCONY SECTION

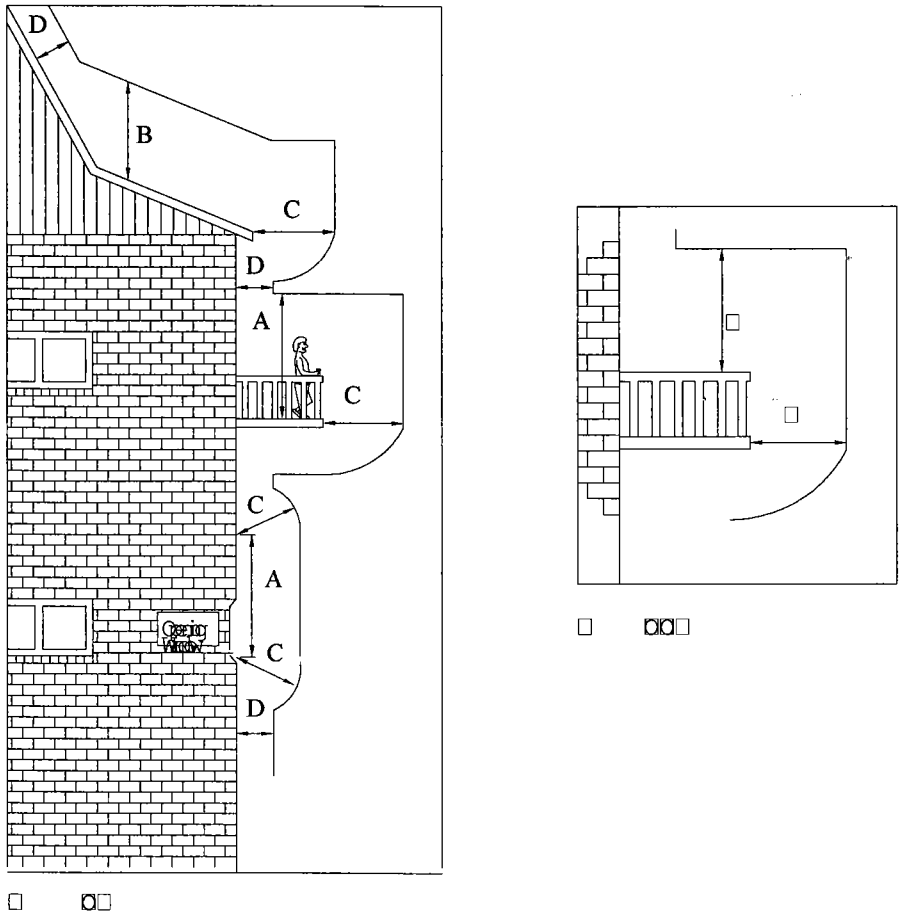


TABLE 3 MINIMUM SAFE DISTANCES OF CONDUCTORS FROM BUILDINGS AND OTHER STRUCTURES WHERE SPECIFIC CALCULATION OF CONDUCTOR MOVEMENT HAS BEEN CARRIED OUT

Safe distance conditions	Not exceeding 1 kV			Exceeding 1 kV		Exceeding 1 kV but not exceeding 33 kV	Exceeding 33 kV but not exceeding 110 kV	Exceeding 110 kV but not exceeding 220 kV	Exceeding 220 kV a.c. or d.c.
	Insulated m	Bare neutral m	Bare active m	Insulated with earthed screen m	Insulated without earthed screen m				
A Vertically above those parts of any structure normally accessible to persons	2.7	2.7	3.7	2.7	3.7	4.5	5	6.5	7
B Vertically above those parts of any structure not normally accessible to persons but on which a person can stand	0.1	2.7	2.7	0.1	2.7	3.7	4.5	6	6.5
C In any direction (other than vertically above) from those parts of any structure normally accessible to persons, or from any part not normally accessible to persons but on which a person can stand	0.1	0.9	1.5	0.1	1.5	2.1	3	4.5	5
D In any direction from those parts of any structure not normally accessible to persons	0.1*	0.3*	0.6*	0.1	0.6	1.5	2.5	3.5	4
E In any direction from the ground	Refer to Table 4								

* This distance can be further reduced to allow for termination at the point of attachment

SECTION 4**SAFE DISTANCES OF CONDUCTORS FROM THE GROUND AND WATER**

4.1 GENERAL

- 4.1.1 This section sets the minimum safe clearance distances for conductors from the ground and water, including minimum safe distances for any excavations or other alterations.
- 4.1.2 Unless specifically identified, the requirements of this section do not apply to traction system conductors or to telecommunications lines, substations and generating stations.

4.2 MINIMUM SAFE DISTANCES OF CONDUCTORS FROM THE GROUND AND POOLS

- 4.2.1 Conductors of any overhead electric line, including any switching connections and transformer connections mounted on poles or structures, shall have distances from the ground not less than specified in Table 4.
- 4.2.2 Table 4 does not apply to existing overhead electric line conductors, or their replacement, where those conductors complied with the Regulations in existence at the time of their installation.
- 4.2.3 Conductors shall not be installed less than 5 m above the water level of any swimming pool.

4.3 MATERIAL DEPOSITED UNDER OR NEAR OVERHEAD ELECTRIC LINES

- 4.3.1 No material shall be deposited under or near an overhead electric line so as to reduce the conductor distance to ground to less than the distances required by Table 4 of this Code.

TABLE 4 MINIMUM SAFE DISTANCES OF CONDUCTORS FROM THE GROUND

Circuit voltage	Vertical distance to ground (m)			Radial distance (m)
	Across or along roads or driveways	Any other land traversable by vehicles (including mobile plant) but excluding across or along roads or driveways	Any land not traversable by vehicles (including mobile plant) due to its inaccessibility (e.g. steepness or swampiness)	
Not Exceeding 1 kV and insulated	5.5	4.0	2.7	2
Not Exceeding 1 kV	5.5	5.0	4.5	2
Exceeding 1 kV but not exceeding 33 kV	6.5	5.5	4.5	2
Exceeding 33 kV but not exceeding 110 kV	6.5	6.5	5.5	3
Exceeding 110 kV but not exceeding 220 kV	7.5	7.5	6.0	4.5
Exceeding 220 kV a.c. or d.c.	8.0	8.0	6.5	5

NOTES:

- (a) Voltages are a.c. except where specified as d.c.
- (b) The term ground includes any unroofed elevated area accessible to plant or vehicles.
- (c) Distances specified in Table 4 are for conductors that have fully undergone mechanical creep (permanent elongation). This is deemed to have occurred after 10 years in service.

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4.4 SAFE DISTANCES OF CONDUCTORS OVER NAVIGABLE WATERWAYS AND BOAT RAMPS

- 4.4.1 The height of conductors over a navigable waterway shall be determined in consultation with the Maritime Safety Authority of New Zealand (MSA). The booklet titled “New Zealand System of Buoys and Beacons”, produced by MSA, shall be used as a guide.
- 4.4.2 Where conductors are installed over a boat ramp, suitable notices shall be provided on either side of the ramp, to provide a warning of the conductors’ presence and an indication of the conductors’ height and voltage.
- 4.4.3 No overhead conductors shall be installed within 9 m in any direction of a boat ramp.
- 4.4.4 Overhead conductors installed between 9 and 12 m of a boat ramp shall be insulated.
- 4.4.5 No boat ramp shall be constructed within 9 m in any direction of an overhead electric line without prior written consent of the electric line owner.

4.5 SAFE DISTANCES OF CONDUCTORS OVER RAILWAY TRACKS

- 4.5.1 The safe distances above rail level at the crossing of the railway for all overhead electric line conductors, when at maximum sag, shall not be less than those specified in Table 5. Where electric traction is in use, refer also to clause 6.2.2.

TABLE 5 MINIMUM DISTANCES VERTICALLY ABOVE RAILWAY TRACKS

Conductors	Distance (m)
Earthed conductors	5.5
Stay wires	5.5
Conductors up to and including 33 kV	6.5
Conductors above 33 kV but not exceeding 220 kV	7.5
Conductors above 220 kV a.c. or d.c.	8

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SECTION 5

SAFE DISTANCES FOR THE OPERATION OF MOBILE PLANT NEAR CONDUCTORS

5.1 GENERAL

- 5.1.1 This section does not apply to live line work or to any conductor forming part of the mobile plant or any collector wire, insulated cable, or flexible cord used for the purpose of supplying electricity to the mobile plant.
- 5.1.2 Mobile plant working near an electric overhead electric lines can damage the line and be hazardous for the plant operator, the mobile plant and people in the vicinity.
- 5.1.3 Conductors can be displaced from their normal position by wind or temperature change. This requires special consideration by mobile plant operators.
- 5.1.4 This section does not apply while mobile plant is in transit on a road and the relevant requirements of the Traffic Regulations 1976 are observed.

5.2 MINIMUM APPROACH DISTANCE

- 5.2.1 The distance between any live overhead electric line and any part of any mobile plant or load carried shall be **“AT LEAST 4.0 METRES”**, unless the operator has received written consent from the overhead electric line owner allowing a reduced distance.
- 5.2.2 When an approval has been obtained pursuant to clause 5.2.1, and subject to clause 5.5.1; the minimum approach distance between a conductor and any mobile plant shall not be less than specified in Table 6.
- 5.2.3 Figure 5 provides a quick reference guide to the minimum safe distances for use of mobile plant near conductors of overhead electric lines.

5.3 WORKING ABOVE OVERHEAD ELECTRIC LINES

- 5.3.1 Mobile plant or any load carried shall not operate above the conductors of any overhead electric line unless the operator has received written consent from the overhead electric line owner to work above the overhead electric line.
- 5.3.2 The use of helicopters above overhead electric lines is governed by the Civil Aviation Rules.

5.4 CONSENT FOR REDUCED MINIMUM APPROACH DISTANCES

- 5.4.1 The application for written consent from the overhead electric line owner shall be made with reasonable notice.
- 5.4.2 The overhead electric line owner's written consent shall advise:
 - (a) The voltage of the overhead electric line and the minimum approach distance to be observed, which shall not be less than the requirements of Table 6; and
 - (b) Any other reasonable conditions to be observed while working in proximity to, or above, the overhead electric line.
 - (c) The section of line to which the consent applies.

TABLE 6 REDUCED MINIMUM APPROACH DISTANCES
(where written consent has been obtained)

Circuit voltage	Minimum approach distance (m)
Not exceeding 1 kV – insulated conductor	0.15
Not exceeding 1 kV – conductor not insulated	1.0
Exceeding 1 kV but not exceeding 66 kV	1.0
Exceeding 66 kV but not exceeding 110 kV a.c. or d.c.	1.5
Exceeding 110 kV but not exceeding 220 kV a.c. or d.c.	2.2
Exceeding 220 kV d.c. but not exceeding 270 kV d.c.	2.3
Exceeding 270 kV d.c. but not exceeding 350 kV d.c.	2.8
Exceeding 350 kV d.c. or 220 kV a.c.	4

5.5 REDUCED MINIMUM APPROACH DISTANCES FOR COMPETENT EMPLOYEES

- 5.5.1 Where the operator of any mobile plant is a competent employee working on, or in the proximity of, an overhead electric line, the approach distances may be reduced in accordance with the safety practices determined by the overhead electric line owner.
- 5.5.2 Direct contact of insulated elevating work platform with live conductors shall be acceptable only under approved live working procedures. Whenever a special reduced minimum approach distance is applied, the maximum practicable clearance from conductors shall be maintained.

5.6 OTHER REQUIREMENTS

- 5.6.1 Where any mobile plant is likely to be used at any time in the proximity of overhead electric lines, the owner or operator of such device shall affix an approved warning notice in a conspicuous place as near as practicable to the operator's position. The notice shall be maintained in a legible condition and shall state:
"WARNING, KEEP CLEAR OF POWER LINES".
- 5.6.2 Any mechanically operated hedge cutter used under or in close proximity to any overhead electric line shall be operated to prevent hedge clippings or other material being thrown into contact with the conductors or creating any other hazard.

FIGURE 5 MINIMUM SAFE DISTANCES FOR THE OPERATION OF MOBILE PLANT NEAR CONDUCTORS

