



Outside Plant Contracts, Rights-of-way, Servitudes and Agreements

Support Structure Service

Construction Standards

Practice number: 651-1000-392 Appendix 3

Document status: Standard B

Issue date: 1999 04 21

Compatible with: 651-1000-392F appendice 3 1999 04 21

Revision history

1999 04 21	Re-issued to make Chapter 3 compatible with 651-1000-392F A03.
1998 11 09	Original issue.

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Chapter 1

General

- 1.1 This document describes or references the Construction Standards, based on Bell Canada technical requirements and industry standards, that Licensees must comply with when performing work on their Facilities on, in or in proximity to one of Bell Canada's Support Structures.
- 1.2 This document contains the following chapters:
 - a. Introduction
 - b. Safety requirements
 - c. Technical requirements
- 1.3 Construction Standards will be modified or replaced from time to time to reflect changes that affect access to Support Structure Service. Notification of such changes will be given at the time Bell Canada makes the decision to proceed with a change or three months before the proposed change, whichever is earlier. As an exception to this notification period, any changes which impact worker or public safety will become effective on the date notification is given.
- 1.4 Notification of changes will be provided to all Licensees whether they are initiated by Bell Canada or a Licensee.

- 1.5 The Licensee's Facilities shall be installed, maintained and used in accordance with Labour Canada and Workman's Compensation Board ("WCB") regulations, all city, municipal, provincial regulations, the Canadian Electrical Code as applicable, and the latest copy of Canadian Standards Association ("CSA") C22.3 No. 1 "Overhead Systems", C22.3 No. 3 "Electrical Coordination", C22.3 No. 5 "Electric Contact Between Overhead Systems and Communications Lines" and C22.3 No. 7 "Underground Systems" without damaging or removing the Support Structures and Bell Canada Facilities.
- 1.6 The placement of Licensees' Facilities on a joint-use pole owned by Bell Canada or on a third-party-owned pole subject to a joint-use agreement is conditional upon the terms of the particular joint-use agreement. If the Support Structure is owned by a party other than Bell Canada, (for example, Hydro) the Licensee must adhere to the specifications and standards of the other party.

Chapter 2

Safety requirements

Location of underground services

- 2.1 Locations of all underground services shall be obtained before excavating for the purpose of installing and working on, in or in proximity to any Support Structures.
- 2.2 Before any cable is cut or opened, it shall be positively identified.

Warning devices

- 2.3 Before the Licensee's employee, contractor or agent performs work on, in or in proximity to Bell Canada Support Structures, they must erect warning devices and barriers to warn the public and vehicular traffic of the hazard. WCB requirements, Industrial Health and Safety Regulations (Section 52), applicable city, municipal, provincial regulations and those of any other regulatory body having jurisdiction shall be met. These devices must remain in place until the worksite is properly closed.

Hazardous materials and conditions

- 2.4 The Licensee's employees, contractors or agents must be trained to recognize unusual or hazardous conditions. If unusual or hazardous conditions are encountered in Manholes such as badly cracked ceiling or walls, the Licensee's employee, contractor or agent must advise his supervisor, who in turn must advise Bell Canada. If conditions warrant, the Licensee's employee, contractor or agent must leave the Manhole.
- 2.5 The Licensee's employees, contractors or agents must not allow the accumulation of any combustible materials while working in Manholes.

- 2.6 Any leak-detection liquid or cable lubricants used by the Licensee's employees, contractors or agents must be non-flammable, non-corrosive and approved by Bell Canada.
- 2.7 Hazardous materials as defined by the Workplace Hazardous Materials Information System must be labeled, stored and used in accordance with the applicable regulations. The Material Safety Data sheets must be available as required.

Work site

- 2.8 Upon completion of work on, in or in proximity of Support Structures, the Licensee's employee, contractor or agent shall remove all its tools, equipment, unused materials, recyclable and non-recyclable materials such as wire and fibre clippings, cable sheathing and other similar matter and leave the work site in the same condition as it was found.

Confined spaces

- 2.9 Canada Occupational Safety and Health Regulations concerning entry into, occupancy of and exit from confined spaces must be followed. All Bell Canada Manholes are considered to be confined spaces under the regulations.

Manhole ventilation and gas testing

- 2.10 The Licensee must follow Canada Labour Code, Part II — Canada Occupational Safety and Health Regulations, Part II, Confined Spaces.
- 2.11 The Licensee's employee, contractor or agent must perform all tests required in accordance with applicable Federal and Provincial laws and regulations for oxygen deficiency and presence of toxic and combustible gases with a tester which meets CSA standards and is in proper working order.
- 2.12 When a Licensee's employee, contractor or agent is in the Manhole, the gas detector must remain in use at all times.
- 2.13 If at any time the gas detector sounds an alarm, the Manhole must be vacated and ventilated for a period of ten minutes. All gas tests must be repeated prior to re-entry.
- 2.14 When ventilating Manholes, the equipment in use must be set up in such a way that it will properly purge all corners of the Manhole.
- 2.15 When necessary to leave the truck engine running, extreme care must be taken to avoid exhaust gases entering the Manhole.

Use of heat gun and open flame

Definitions

- 2.16 **Heat gun** A heat gun is an electrically powered heat blower used in the application of heat shrink tubing. The heat gun has the following specifications: temperature at nozzle of 149°C through 260°C, 120 volts, 60 Hz and 12 amperes.
- 2.17 **Open flame** Open flame refers specifically to the flame required to heat shrink certain types of heat-shrinkable tubing.
- 2.18 **Heat-shield pad** A heat-shield pad is a rectangular synthetic cloth that must be used as a heat barrier to protect adjacent cables, equipment and other objects that could catch fire or be weakened by heat during the heat-shrink operation.

Procedures

- 2.19 Bell Canada shall permit the Licensee heat-shrinking privileges according to the following operating procedures and conditions.
- 2.20 The Licensee must advise Bell Canada that a heat gun or open flame was used in a Bell Canada Manhole when obtaining the Manhole closing number.
- 2.21 These heat gun and open flame privileges are at the absolute discretion of Bell Canada and may be denied or revoked at any time. These privileges will not be denied or revoked unreasonably.

- 2.22 The use of the heat gun or open flame for the application of heat-shrinkable tubing is granted, provided that the following procedures are strictly observed.
- a. Gas testing and ventilation of the Manhole must be performed by the Licensee prior to and during operation of the heat gun or open flame.
 - b. Any combustible materials must be removed from the Manhole before using a heat gun or open flame.
 - c. A heat-shield pad must be used to protect any adjacent plant within 0.6 metre of the heat-shrinking operation.
 - d. The electrical cord connected to the heat gun must be of sufficient length to extend out of the Manhole during the operation of the heat gun, ensuring that no electrical connections are made in the Manhole.
 - e. The heat gun or open flame must be removed from the Manhole immediately if the ventilation equipment fails or its operation is interrupted.
 - f. The heat gun or open flame must not be laid down anywhere within the Manhole while it is turned on or hot.
 - g. Care must be exercised so that the radiating heat from the heat gun or open flame does not damage adjacent cables or equipment.
 - h. The heat gun or open flame along with all associated material and equipment must be removed from the Manhole when not in use.
 - i. The torch shall be shut off by closing the cylinder valve so that gas in the hose and regulator will be burned off.

Use of power tools in Manholes

- 2.23 Electric power tools may be used in Manholes only if operated from an ungrounded portable electric generator (circuit isolated from ground) or if battery operated. The cords and any associated extension cord must be secured so that they will not separate in the Manholes.
- 2.24 Only the test leads from high-voltage spark-producing test sets such as meggers and breakdown test sets and also ac-powered testing devices such as oscilloscopes, sweep generators, field strength meters and portable televisions are allowed in Manholes.
- 2.25 Battery operated devices such as volt-ohm-milliammeters, transistorized field strength meters and testing equipment may be taken into Manholes to facilitate system maintenance.

Chapter 3

Technical requirements

- 3.1 All materials used by the Licensee must be approved to meet or exceed the latest issue of applicable CSA Standards and Bell Canada specifications.
- 3.2 The bonding hardware must have an ampacity equivalent to or greater than No. 6 AWG copper.

Electrical protection

- 3.3 Support Strands, Cables, Power Supplies and Subscriber Drop Wires shall be bonded and/or grounded in accordance with the latest issue of CSA Standard C22.3 No. 1 “Overhead Systems”, C22.3 No. 5 “Electric Contact Between Overhead Supply and Communications Lines” and C22.3 No. 7 “Underground Systems”.
- 3.4 The following items 3.5 through 3.34 are identified for clarity, the listing of which does not intend to replace the above mentioned standards.
- 3.5 Cable sheath-to-strand bonds must be made at the beginning and end of the lead and at 300-m intervals. The following requirements must be met for such bonds.
 - a. On cables in built-up areas, bonds normally occur at terminal and splice locations. However, additional bonds are necessary if the 300-m requirement cannot be satisfied by terminal or splice locations. Lead sleeves or closures at terminals and splice locations must have a metallic sheath-to-strand bond using No. 6 AWG insulated copper ground wire.
 - b. For coaxial cables and equipment, the same bonding rules apply as mentioned in (a).
 - c. Fibre cables have lenient bonding requirements and can be bonded at 600-m intervals.

- 3.6 Where two or more suspension strands are located on the same pole line, they must be bonded together at 300-m intervals. If the strands are supported on the same suspension clamp, the clamp functions as the bond.
- 3.7 Where taped joints are made in aerial cable, or temporary closures are applied to the aerial cable, the sheath continuity must be maintained by placing a temporary bond at the tape joint.
- 3.8 Wire or tape armour must be bonded to the cable sheath on each side of the splice.
- 3.9 The hardware used to make these connections must be independent of the Bell Canada hardware.
- 3.10 Miscellaneous buried or underground dips in a predominantly aerial plant, for example at street or highway crossings, must not be considered as forming the start or end of an aerial lead.
- 3.11 Miscellaneous aerial spans in a predominantly buried or underground plant, for example at creek or culvert crossings, do not require bonding.
- 3.12 For all facilities used to provide service for, or in proximity to, Hydro power substations or high-voltage towers, special electrical protection measures will apply. Designs must be submitted with the Lessee's application for approval.

Aerial Joint Use with power

- 3.13 For power system voltages up to 27.6 kV phase-to-phase (15.9 kV phase-to-ground), the following requirements apply.
 - a. The power system must be wye-connected with a continuous multi-grounded neutral (MGN). The MGN must be continuous from the power substation to the start of and throughout the joint-use section.
 - b. The start of the joint-use section must be at least 1 km from the power station and be outside the zone-of-influence boundary (ZIB).
 - c. Bond the strand to the MGN at the beginning and end of each joint-use section and at all vertical MGN ground wires that it passes. The maximum spacing between two ground points must not exceed 300 m.
- 3.14 For all other designs, a meeting must be convened between the Licensee, Hydro and Bell Canada to determine the requirements.

Aerial non-Joint Use

- 3.15 The grounding measures are required for an aerial non-joint-use plant based on the length of the lead. Grounding requirements are based on the following guidelines.
- a. If the lead measures less than 1.2 km, place a ground at the far end of the lead.
 - b. If the lead measures more than 1.2 km, place a ground at the beginning and end of the lead and at 1.2-km intervals in between. No point on the cable sheath can be further than 600 m from a ground.
- 3.16 At any location where the Licensee's Facilities join Bell Canada aerial Support Structures from a power utility structure or any other non-Bell Canada-owned structures, the Licensee shall install, on the first power utility pole or third-party pole adjoining the Bell Canada structure, a ground connection from the Licensee's Strand to the MGN using No. 6 AWG copper ground wire.
- 3.17 Extensions to leads that have an existing far-end ground require additional grounds when the lengths of the extensions exceed 1.2 km.

Buildings

- 3.18 Where the Licensee is required to ground Facilities inside a building, Licensee ground clamps and grounding conductors shall be completely independent of those used by Bell Canada.
- 3.19 Bond the fibre optic cable sheath and support strand to the MGN before entering a building.

Underground cable

- 3.20 The Licensee shall bond all equipment and the cable shield to the bonding ribbon in each Manhole using No. 6 AWG copper ground wire or bonding ribbon. A cable sheath should not be opened for the sole purpose of making this bond.

Buried cable

3.21 When buried cable is placed in a joint-use trench with the electrical utility, the following conditions must be met (CSA C22.3 No.7, section 4, latest issue).

- a. At each transformer location, the metal sheath or shield shall be interconnected with available neutrals. If this does not provide a connection between the cable sheath or shield and the primary neutral within 300 metres of each terminal, additional connections shall be made to meet this requirement.

Equipment, other than transformers, with exposed non-current-carrying metal parts shall be grounded with either a bare neutral or grounding electrode (if the neutral is insulated) connected to the supply MGN.

- b. If random separation cable placing is to be practiced, then
 - the electrical utility maximum primary voltage is not to exceed 22 kV phase to ground.
 - all primary electrical utility cables should be of the bare concentric neutral type. If a jacketed concentric power conductor is used to prevent corrosion, then a bare No. 4 AWG copper conductor shall be used to facilitate this common bonding.
- c. Where underground or buried cable is looped up a pole to provide access for self-supported drop wire, the support wire shall be bonded to the tap unit using No. 6 AWG copper ground wire. If a Strand is present on this pole, the tap unit must also be bonded to the Strand.
- d. When placing buried service wire, the armour, if present, is to be bonded to the cable sheath at the junction point between the cable and the buried wire.

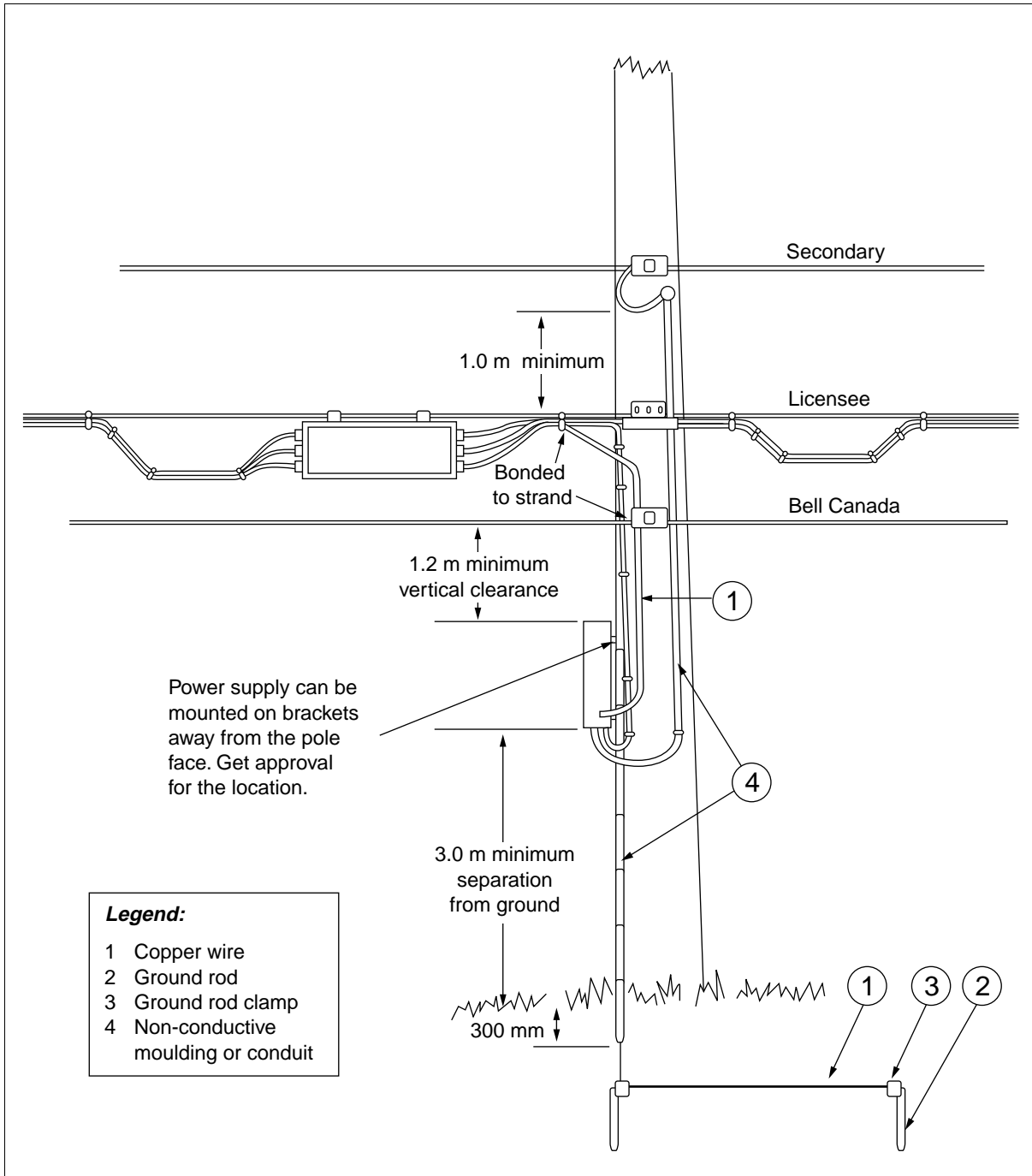
Power supply

3.22 The following are minimum requirements and the standards outlined in the Canadian Electrical Code or provincial electrical codes must be followed.

Installation

3.23 Where Bell Canada authorizes the installation of alternating current (“AC”) power supply units, circuit breakers, power meters and other associated equipment on poles, the equipment must conform to the technical requirements of 3.32 et 3.33 and shall be mounted in the location specified on the Application Form authorizing its installation. See Figure 1 for standard power supply installation.

Figure 1
Power supply installation



- 3.24 The power supply locations to avoid are:
 - a. corner poles and transformer poles
 - b. poles where there is an underground riser Conduit or other pole-mounted equipment
 - c. poles where access to Strand-mounted equipment of other users could be impeded

Bonding and grounding

- 3.25 The neutral side of the power service conductor shall be continuous and unfused.
- 3.26 At power supply locations, the Licensee must provide and be connected to a dedicated ground electrode and to an MGN when available.
- 3.27 See Figure 1 for the acceptable configuration for ground rods.
- 3.28 Bond the power supply and its cabinet to the Strand (see Figure 1).
- 3.29 Perform all bonds with No. 6 AWG copper wire.
- 3.30 To eliminate additional ground wire runs on the pole, it is sufficient to use one No. 6 AWG ground wire interconnecting the cable Strand, the MGN, and the ground rod, bonding all elements of the installation to it (power supply, cabinet and meter base if used).
- 3.31 Cover all bonding and grounding wires with non-conductive moulding from below ground level and through the neutral space (see Figure 1).

Technical requirements

- 3.32 The electrical power distributed from the power supply to other Facilities shall be in the form of AC at a frequency of 60 Hz with an operating voltage not greater than 90 volts (“rms”) and current not greater than 15 amperes.
- 3.33 Licensee’s Facilities shall not induce noise in Bell Canada cable and equipment. Noise shall be deemed to exist if the power influence on Bell Canada cable and equipment (unless already less than 75 dBrnC) increases by more than 3 dBrnC, when Licensee Facilities are turned on.

Hazardous conditions

- 3.34 At the request of the owner of the Support Structure, all power shall be disconnected if the unit has created an electrically hazardous condition or if found to violate the limits found in items 3.32 or 3.33.

Subscriber Drop Wire

- 3.35 Subscriber Drop Wire shall be installed and maintained with sags according to the sag specifications specified in Bell Canada Specification(s).
- 3.36 Subscriber Drop Wire shall be supported by a Licensee installed drive hook when:
- a. placed parallel to the Strand
 - in line with and 150 mm below the Strand using a Licensee-installed Strand span clamp or the attachment feature available as part of the multi-tap unit
 - a minimum separation of 150 mm is to be maintained between the Subscriber Drop Wire and any adjacent Bell Canada Strand
 - b. leaving the pole for clearance purposes only
 - 760 mm above the Strand when servicing a subscriber's premises
- 3.37 Subscriber Drop Wire, regardless of the location of the tap unit, shall only leave the pole from the Licensee's drop wire hook or the Strand at 1.83 m or more from the centre of the pole as designated as measurement "C" in Figure 2 and "D" in Figure 3.
- 3.38 The Licensee shall not use Bell Canada drive hook, guard arm hook or building attachment devices for supporting Subscriber Drop Wires. The Licensee may use existing Bell Canada drop wire ring runs on poles provided the combined number of drop wires does not exceed 10.
- 3.39 Where self-supporting Subscriber Drop Wire is terminated on a Licensee's drive hook or guard arm hook, it shall be bonded to the cable Strand.
- 3.40 Bell Canada ground clamp or ground wire inside buildings or residences shall not be used by the Licensee to ground Subscriber Drop Wire.
- 3.41 Where the number of drop wires on one side of the pole exceeds the number on the opposite side by six or more, thereby causing an imbalance to the structure, the Licensee shall provide the necessary guy.
- 3.42 When the Licensee finds it necessary to attach Subscriber Drop Wire to the aerial Support Structure to cross said structure, the crossing attachment shall be installed only at a pole.

Figure 2
Location of Licensee's Strand-mounted Facilities (Bell Canada Strand)

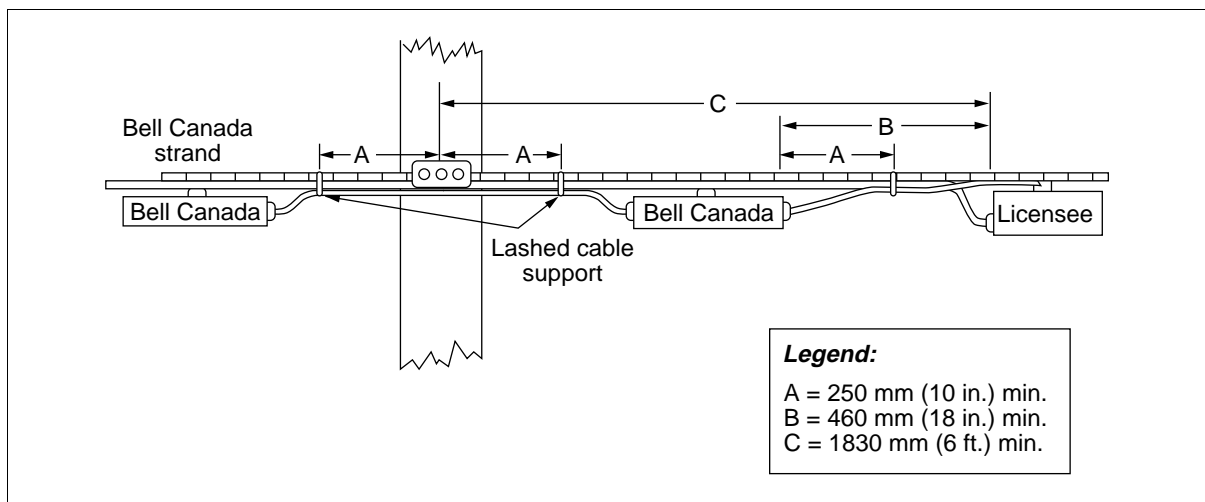
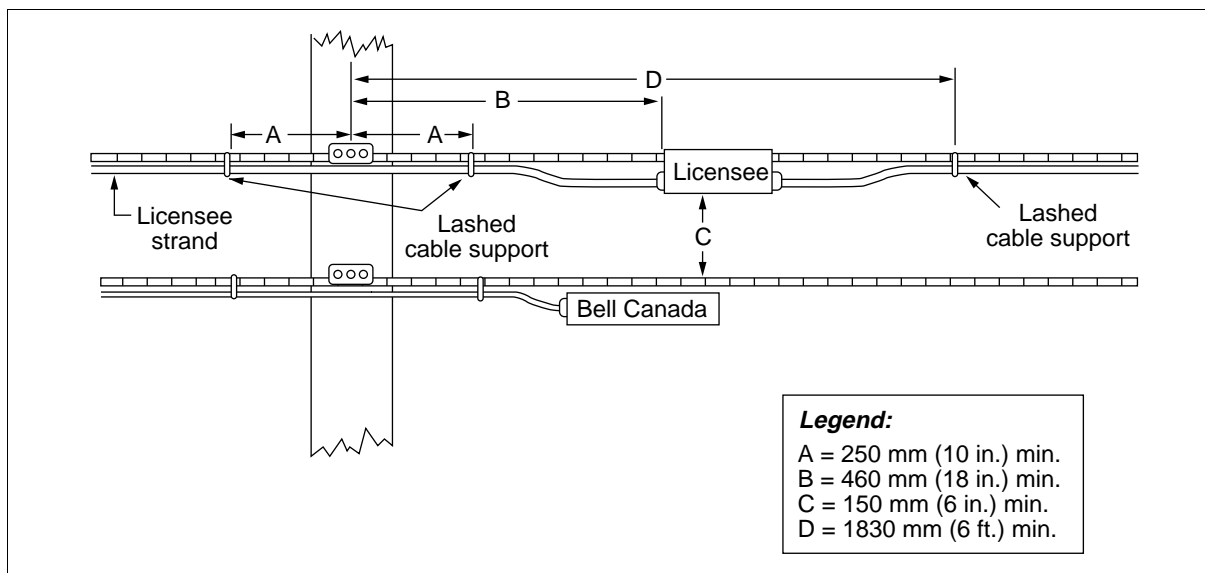


Figure 3
Location of Licensee's Strand-mounted Facilities (non-Bell Canada Strand)



- 3.43 Subscriber Drop Wire shall not come into contact with any span of Bell Canada drop or power utility wires.
- 3.44 Subscriber Drop Wire leaving the pole shall be placed so as to provide a 762-mm-by-762-mm climbing space (see Figure 4).

Rules for working in underground support structures

- 3.45 Bell Canada shall permit the Licensee and their contractors or agents unsupervised Manhole access according to operating directives and conditions identified in 3.46 through 3.57.

Disposal of Manhole effluents

- 3.46 It is the Licensee's responsibility to ensure Manholes, to which the Licensee seeks access, are pumped clean and that any effluent is properly disposed of and/or treated in accordance with all applicable statutes and regulations. Local environmental regulations may specify that contaminated water cannot be pumped untreated into the sewer systems, into waterways or onto land.

Emergency conditions

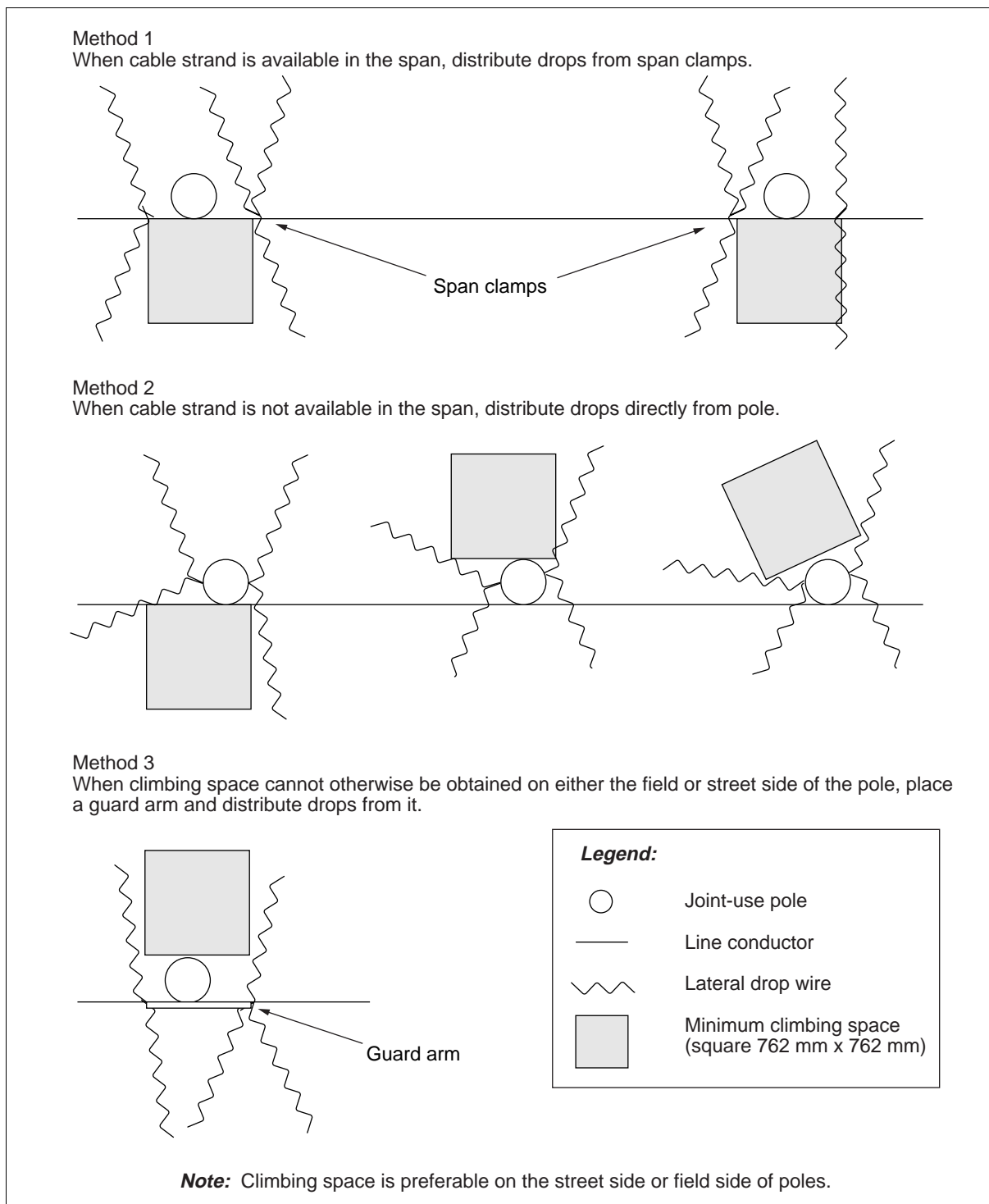
- 3.47 Bell Canada may restrict access to any and all Manholes immediately and without notice, in the event of an emergency or unusual situation.

Manhole access

- 3.48 The Licensee or his contractors or agents must obtain a Manhole opening number by calling the Bell Cable Repair Service Bureau (CRSB). The following information must be provided when calling Bell Canada's designated control centre:
 - a. the full registered name of Licensee
 - b. the full registered contractor's or agent's name accessing the Manhole on behalf of Licensee
 - c. the Licensee's contact name
 - d. the Licensee's contact phone number
 - e. the Manhole's civic address or location
 - f. the Licensee's Permit number or applicable authorization
 - g. if no Permit number, reason for requesting Manhole access
 - h. the description of work to be performed

Note: Manhole access will be denied where unsafe conditions exist.

Figure 4
Climbing space



- 3.49 The Licensee or his contractors or agents must advise Bell Canada at the time of entering a Manhole and within 30 minutes after exiting a Manhole. Failure to provide any of the required information will result in access being denied.
- 3.50 Any Bell Canada employee, agent or representative shall have authority to:
- a. verify the reasons why any Licensee, its agents or contractors are working in Bell Canada Manholes
 - b. inspect the work site and the equipment of any Licensee, agent or contractor
 - c. require proof that the Bell Canada Manhole opening number was received for any Licensee, agent, or contractor working in Bell Canada Manholes
- 3.51 The Licensee agrees that the Bell Canada employee, agent or contractor will not be acting in a supervisory capacity and shall be under no legal duty to do so. The actions of the Bell Canada employee, agent or contractor will be subject to review by Bell Canada and the Licensee.
- 3.52 All equipment and cable splices shall be placed as specified on the Permit and in such a manner so as not to block access to the other party's Facilities.
- 3.53 The employees, contractors or agents of the Licensee shall not use work platforms, supports or planks placed or lashed to any of Bell Canada cables or other equipment located in the Manhole.

Manhole entry and exit

- 3.54 The Licensee's employee, contractor or agent must use a portable ladder. When entering, exiting and working in Manholes, the Licensee's employees, contractors or agents shall not step on, disturb, rearrange, or damage Bell Canada cables, air pipes or other equipment. In the event such Facilities are damaged, the Licensee must contact Bell Canada immediately.

Licensee's Facilities in Manholes

- 3.55 All the Licensee's Facilities within Bell Canada Manholes must be supported on and securely attached to rack supports provided by Bell Canada for this purpose or to brackets attached to Manhole walls by the Licensee.
- 3.56 The Licensee will be permitted to install in Bell Canada Manholes only equipment not requiring direct connection to a commercial power supply for its operation.
- 3.57 All equipment and cable splices shall be placed in such a manner so as not to block access to Conduits or the other party's Facilities.

Identification of Licensee's Facilities

- 3.58 At the time of Facility installation, the Licensee shall provide and install identification tags clearly identified with the Licensee's company name or logo. Upon acquisition of another party's Facilities, the Licensee must submit a letter to Bell Canada, for Bell Canada approval indicating the required time frame to re-tag the Facilities.
- 3.59 The identification tag materials and methods of attaching shall be as specified in item 3.60 through 3.64 hereof or as mutually agreed upon, in writing, by both parties.
- 3.60 The Licensee shall provide and affix at the time of installation, and maintain in place, identification tags on:
 - a. each of the Licensee's Strands, at each pole
 - b. each of the Licensee's cables attached to Bell Canada Strands, at each pole
 - c. each of the Licensee's cables entering a Bell Canada Manhole or other access point
 - d. the cable, above the U-guard for the cables surfacing on a pole
 - e. the cable, at the point where it enters and exits the Manhole
 - f. for fibre optic slack storage; see Figure 5 and Figure 6
 - g. the Licensee's Conduit and Conduit plug, for each Licensee's Conduit attached to a Bell Canada Manhole
 - h. enclosures not in normal proximity to a pole

Figure 5
Aerial plant fibre optic cable—slack location

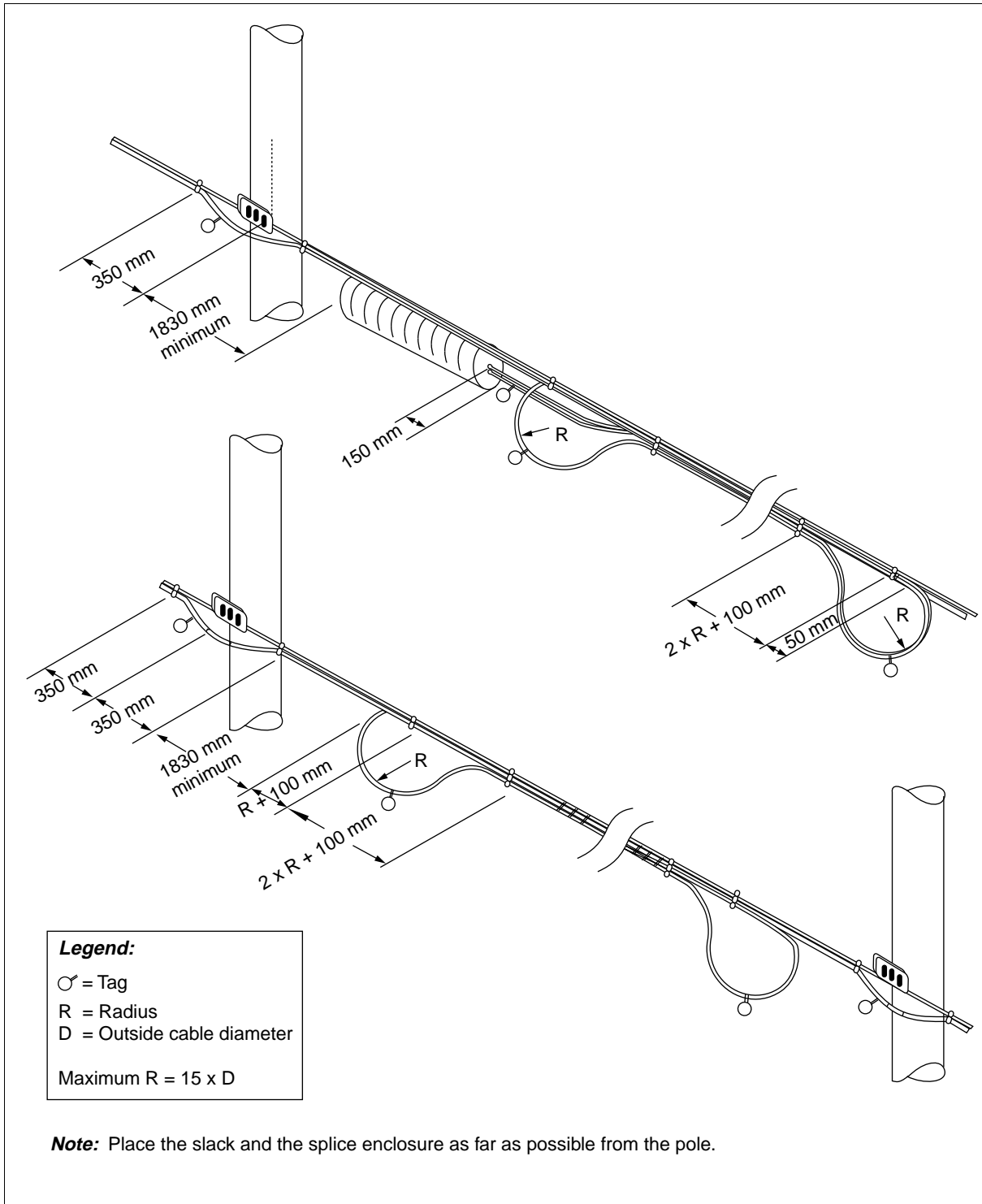
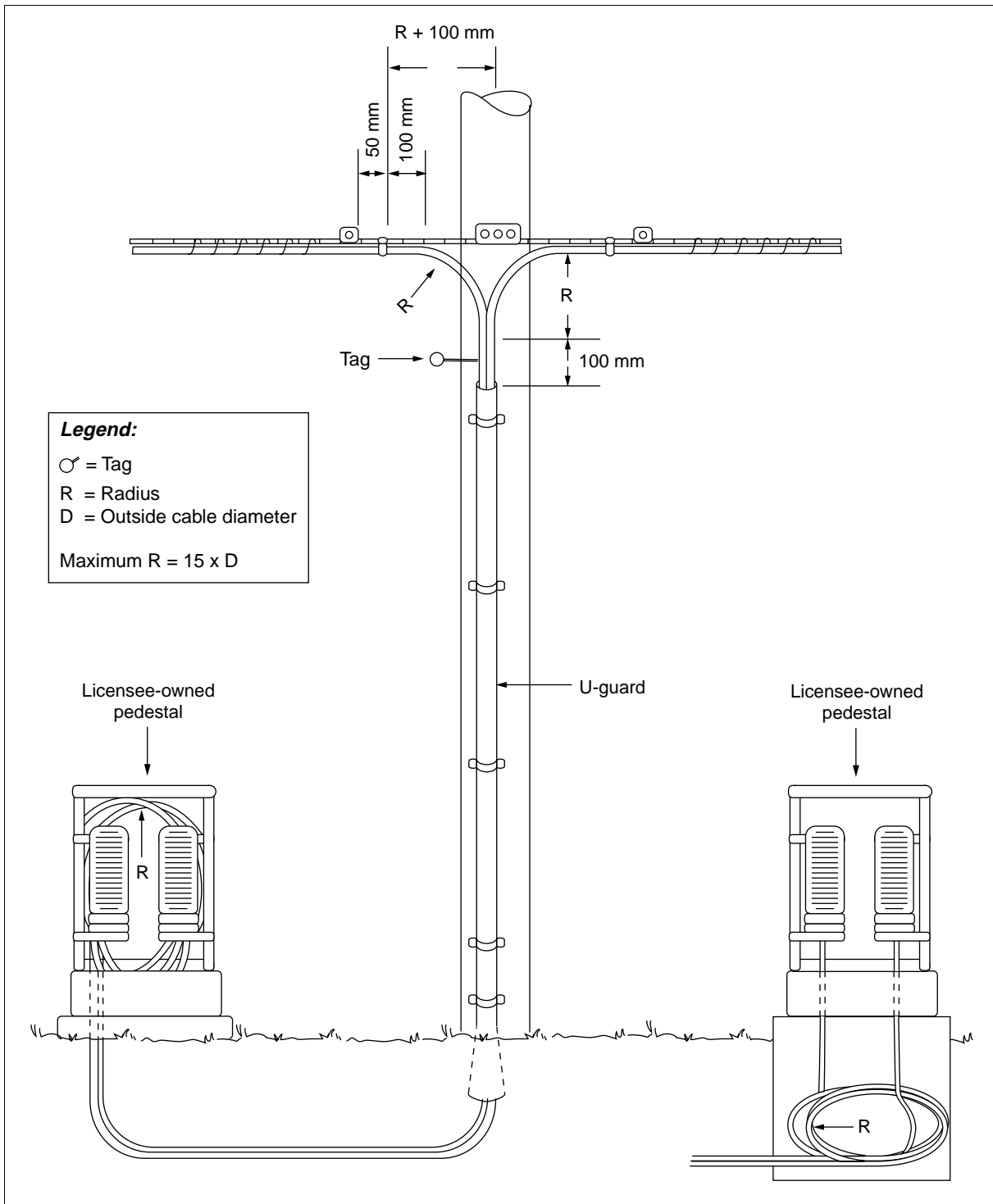


Figure 6
Aerial plant fibre optic cable—dip pole location



- 3.61 For aerial applications, each Licensee cable and/or Strand must be identified by a tag with the Licensee's name or logo on non-corrosive metallic, non-metallic or UV-resistant vinyl plastic tag of such size and colour as to be readily visible from ground level after installation.
- 3.62 Pole- or Strand-mounted equipment (including splice enclosures) shall have the Licensee's name or logo on non-corrosive metallic, non-metallic UV-resistant or vinyl plastic tag of such size and colour as to be readily visible from ground level after installation, such tag having a waterproof adhesive backing suitable for application to a metal surface from -20°C through 40°C.
- 3.63 Licensee equipment mounted in Manholes is to have identification tags (as described in the item above) placed on the surface of the equipment most visible from within the Manhole.
- 3.64 When Bell Canada authorizes the Licensee to abandon its Facilities on or in the Support Structures, the Licensee will remove all its identification tags.

Slack storage of fibre optic cable

- 3.65 The amount of slack cannot exceed Bell Canada specifications. Amount and location of slack storage loops must be presented to Bell Canada for approval as part of the Application process. Permission will be granted on a case-by-case basis dependent on projected loadings, available Spare Capacity, congestion and aesthetics. Where permitted, stored slack will be as shown in Figure 5 and Figure 6.

- 3.66 The storage locations of slack from the fibre optic cable on or in Bell Canada Support Structures are:

Aerial cable

Lash the cable slack (together with splice closure if applicable) directly to the Strand (see Figure 5). The slack can also be stored in a Licensee-owned pedestal (see Figure 6).

Underground cable

Pull throughs When cable is being pulled through an intermediary Manhole, where no splicing will take place, the cable should enter and leave the Manhole within the shortest distance possible racking cables at an appropriate level (see Figure 7).

Present and future splice locations Cables shall be racked in accordance with Figures 8 through 10 unless otherwise specified by Bell Canada.

Stored slack loops (slack storage) are not allowed in Bell Canada structures. Licensee cables may exit Bell Canada underground structure to enable slack storage to take place in a Licensee-provided and Permit-approved housing. Bell Canada personnel must be on site when this breakout occurs and the Licensee will be billed appropriate costs.

Only sufficient Licensee cable should be placed in Bell Canada structures for logistical purposes, entering into an amplifier (coax) or to get to a point without affecting the integrity of the cable (coax, fibre, other).

The maximum amount of cable length permitted in Bell Canada Manholes is one and one-half times the circumference of the Manhole.

Figure 7
Intermediary Manhole pull through

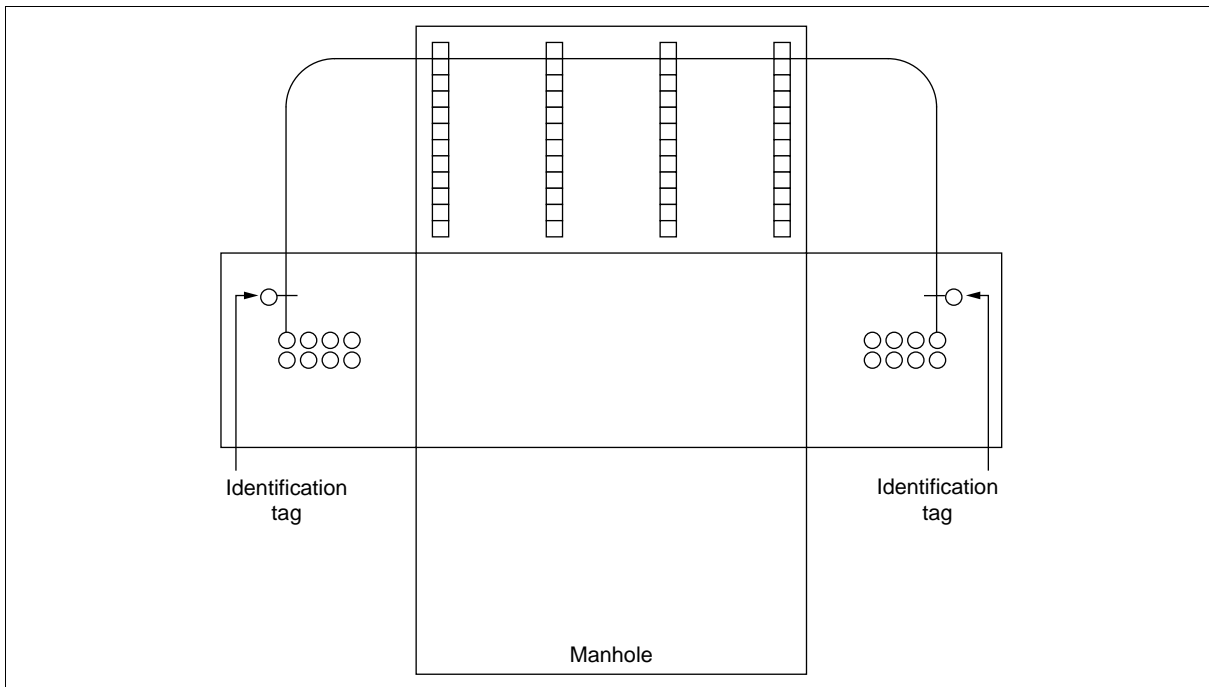


Figure 8
Racking when splice performed in Manhole

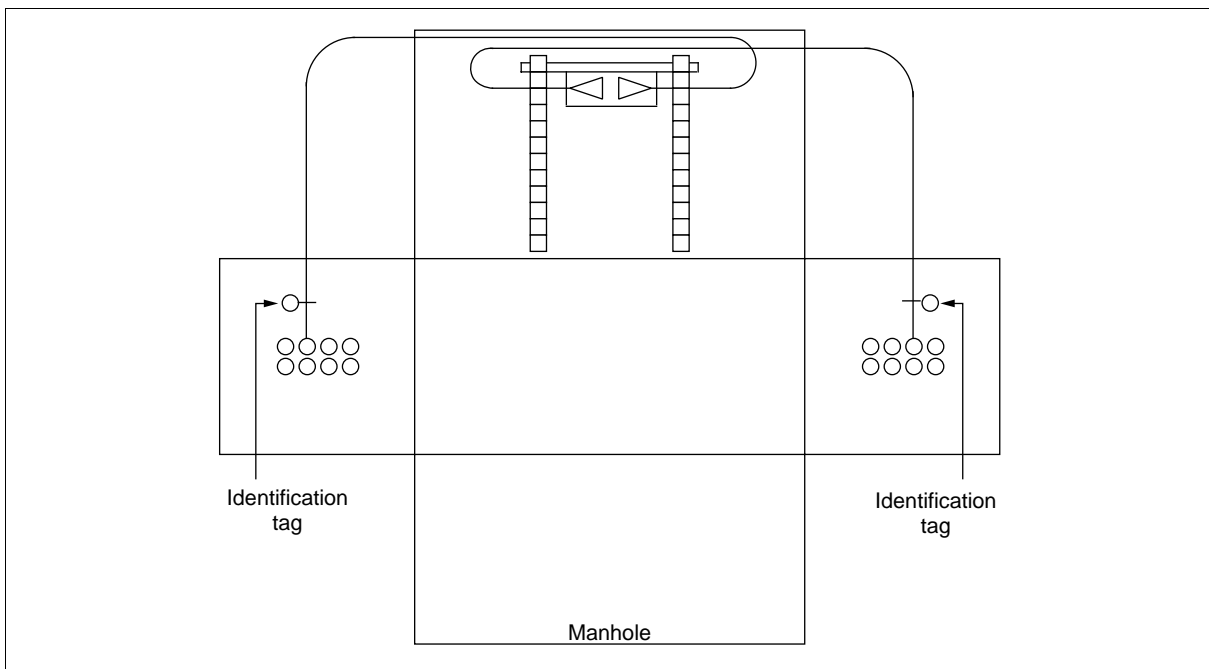


Figure 9
Racking for above-ground straight splice

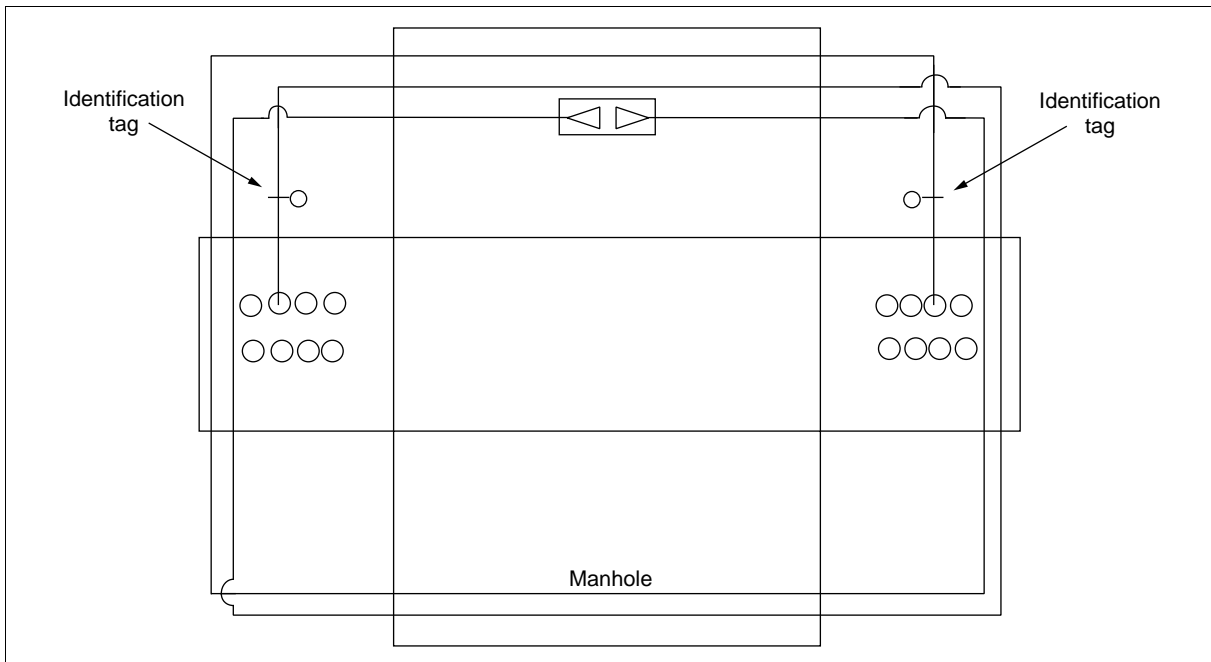
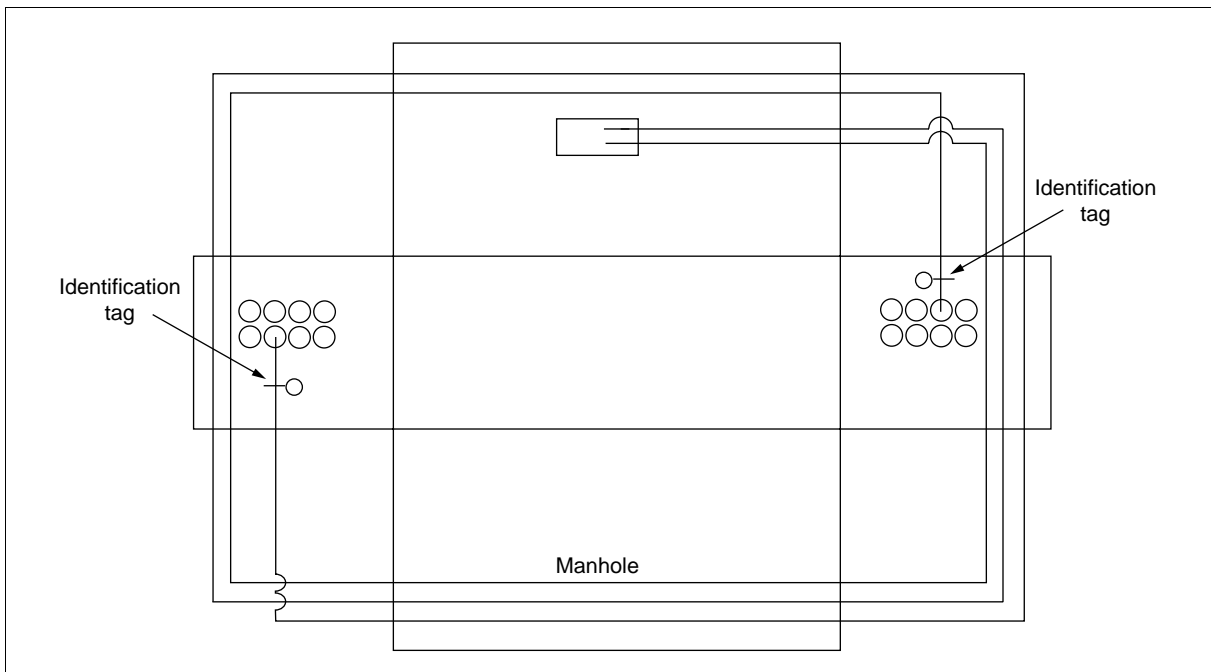


Figure 10
Racking for above-ground butt splice



Placement of aerial cable

- 3.67 Licensee cables, except Subscriber Drop Wires, placed on aerial Support Structures shall be lashed to a Strand.
- 3.68 When lashing cable to Bell Canada Strand, the Licensee's lashing wire shall be terminated on Strand-mounted lashing wire clamps, located 304 mm from the centre line of the pole.
- 3.69 The aggregate weight of all cables attached to the Licensee's Strand shall not exceed the values permitted in Bell Canada specifications.
- 3.70 All cables shall be installed horizontally across the face of the pole and attached to a minimum distance of 250 mm on each side of the centre line of the pole and supported by cable supports as indicated by measurement A in Figure 2 and Figure 3.
- 3.71 The Licensee's Strand-mounted equipment shall be placed according to Figure 2 and Figure 3.
- 3.72 Bell Canada Strand supported on the walls of buildings shall be used to support the Licensee's cable only if approved by Bell Canada. Where the existing Facilities of Bell Canada are attached directly to a building wall, the Licensee shall not use Bell Canada Facilities as a Support Structure nor shall the Licensee use the cable supports installed by Bell Canada.
- 3.73 Where tap units or other units of the Licensee's Facilities bear against Bell Canada Facilities in a manner which could cause damage, the Licensee is responsible to install the necessary protective equipment on its Facilities at its expense.
- 3.74 When installing cable on Bell Canada Strand, the Licensee shall remove any equipment placed to provide physical protection for existing cables, such as squirrel guard and tree guards, and replace it in its original condition. Bell Canada reserves the right to add or remove said equipment as required.
- 3.75 When the Licensee applies for the use of a dip pole, Bell Canada will determine, at the time of the search, the location where the Licensee should place its cable. This information will be provided on or with the Application.
- 3.76 Refer to specifications in 3.65 and 3.66 before placing fibre optic cables.

Placement of Strand

- 3.77 The Licensee shall place Strand of the size and at the location as specified in the Permit.
- 3.78 The Licensee shall adjust the tension of the Strand to the appropriate value for the temperature at the time of installation. When cables are later attached to this Strand, the resultant sags caused by maximum ice or thermal loading shall not exceed the values shown in Bell Canada specifications.
- 3.79 All Licensee-owned Strand placed on Bell Canada Support Structures must maintain a minimum vertical separation of 150 mm at mid-span from any other Strand placed on the same pole line.
- 3.80 The Licensee shall not bore holes in poles for bolts at less than 100 mm vertical distance from any existing bolt or at less than 250 mm from the top of a non-joint use pole.
- 3.81 When, at either the pole or the building end of a span, it is not possible to install a guy or otherwise support the stringing tensions, the Licensee may use unguyed slack span construction provided that there is no other slack span Strand at the same location. A slack span shall be constructed to Bell Canada specifications. Prior to attachment to any building, building owner concurrence shall be obtained and applicable building codes must be met.
- 3.82 If approved by Bell Canada, the Licensee may attach only its cable to Bell Canada's slack span Strand.

Guys and anchors

- 3.83 The Licensee may use an existing Bell Canada anchor to support the Licensee's Strand when approved by Bell Canada in its Permits. Where the existing anchor is not sufficient to support the Licensee's Strand, Bell Canada will provide additional anchorage and charge the Licensee a make-ready charge.
- 3.84 Where Bell Canada Strand and the Licensee's Strand are constructed along the same pole line, Bell Canada will specify the locations of the Licensee's deadend attachments. Where both these Strands deadend at the same pole, 305 mm of vertical separation is required between cable suspension bolts.
- 3.85 The Licensee shall support its Strand by head guys and side guys which must be designed using the formulae in Figure 11 and Figure 12. If two or more conditions apply, the condition requiring the greater strength shall govern.
- 3.86 Guys required solely to support the Licensee's Strand shall be installed and owned by the Licensee.

Figure 11
Guying (part 1 of 2)

The following formulae are used to calculate the size of side or head guys required to balance transverse or longitudinal forces on a pole at a corner, a partial deadend or a complete deadend.

$$S = \frac{P}{50} \times T \times G \times FS \div L$$

WHERE: S = design tension in guy (pounds)
 P = pull on corner (use 50 for head guy)
 T = design tension in supporting strand (pounds), normally 60% of breaking strength
 G = length of guy
 L = lead of guy

FS = Factor of Safety
 1.60 for grade 1 construction
 for plant crossing or in proximity to
 railway tracks
 1.25 for grade 2 construction

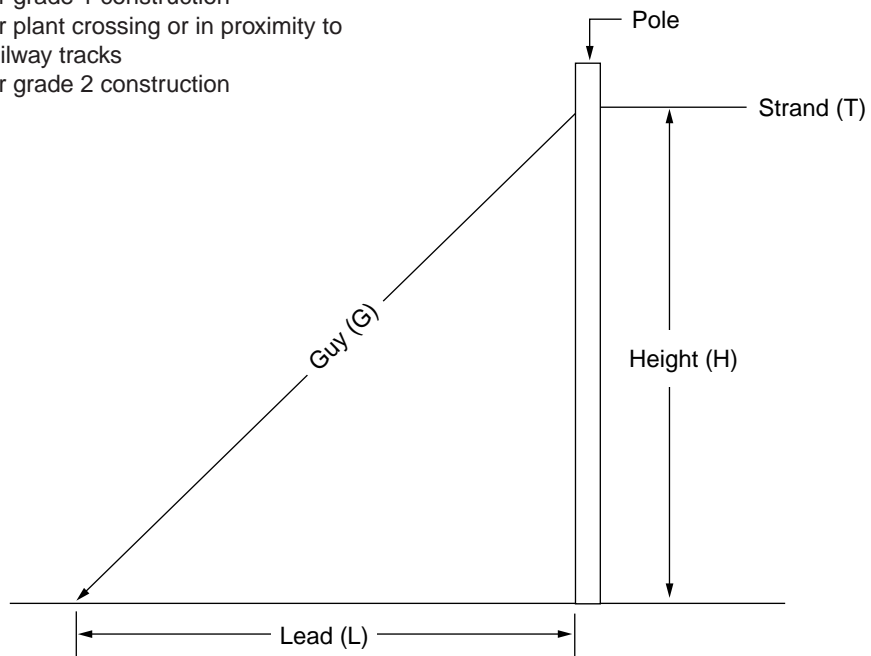
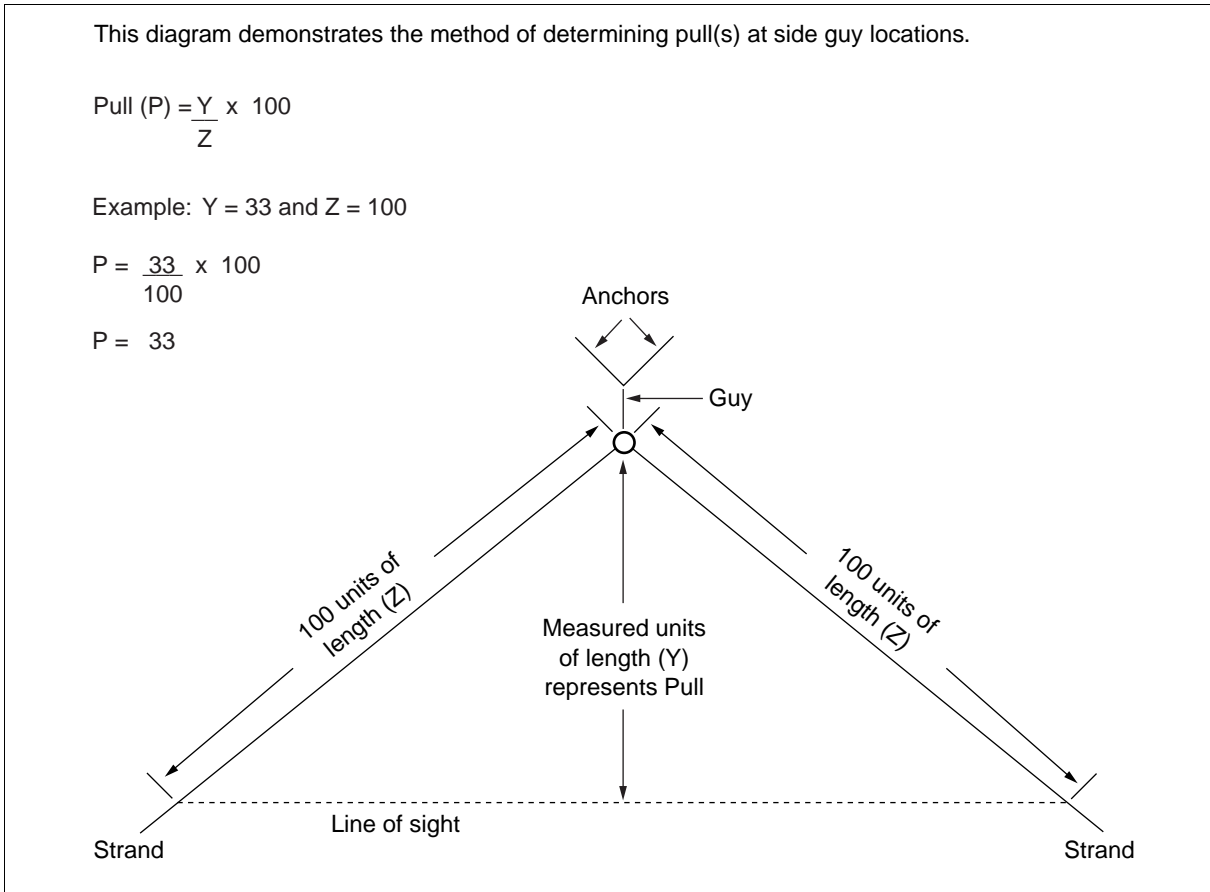


Figure 12
Guying (part 2 of 2)



- 3.87 The Licensee shall place strain insulators in all guys, when required to meet Bell Canada requirements. Where the Licensee's guy is not insulated, it shall be bonded to the Licensee's Strand in accordance with 3.88.
- 3.88 Where the Licensee's guy requires grounding to comply with 3.87, the Licensee shall bond it to its Strand with a No. 6 AWG copper ground wire, unless the guy and Strand are attached to a common bolt.
- 3.89 Strain insulators shall be comparable in strength and electrical properties to those used on the same pole or in the same vicinity by Bell Canada.
- 3.90 The location of the insulator in the guy shall be as specified in 3.91 and not conflict with insulators in adjacent guys.
- 3.91 Where a strain insulator is required in accordance with 3.87, it shall be so located that in the event of a guy failure below it, the insulator location will be not less than 2.5 m above ground (see Figure 13).
- 3.92 All guys exposed to vehicular or pedestrian traffic require highly visible coloured metal or plastic guy shields or guards not less than 2.5 m long, placed with their lower ends as close to the ground line as practicable. Each guy must have a shield installed per CSA 22.3 No 1.

Underground support structures

- 3.93 Whenever a Licensee performs the work necessary to interconnect its own Conduit to a Manhole, the Licensee shall ensure that the Conduit is plugged in such a manner as to prevent the entry of liquids or gases into the Manhole. In the case of a building-entrance Conduit connection established by a Licensee, the Licensee shall ensure that such connection is properly plugged at the building end.
- 3.94 The Licensee shall not remove or disconnect any Conduit connections from the underground Support Structures without written authorization from Bell Canada. When Conduit has been removed, the remaining Conduit must be permanently sealed using the appropriate sealing compound.
- 3.95 Licensee Conduit which is directly interconnected to third party Conduit systems containing high-voltage underground cables shall not be permitted interconnection to Bell Canada underground Support Structures unless said Conduit is used for the sole purpose of placing dielectric fibre optic cables.

Figure 13
Location for guy insulators

