



Ohio Revised Code

Section 1563.35 Criteria or specifications applied to plans.

Effective: June 14, 2000

Legislation: House Bill 601

The chief of the division of mineral resources management shall approve roof control plans on a mine-by-mine basis in accordance with the criteria or specifications set forth in this section.

Additional measures may be required. Roof control plans that do not conform to these criteria or specifications may be approved if the operator satisfies the chief that the resultant roof conditions will provide no less protection to the miners.

(A) The following criteria apply to full roof bolting plans. A full roof bolting plan is one in which roof bolts constitute the sole means of roof support at a face as part of the normal mining cycle.

(1) Roof bolt assemblies shall meet the following specifications:

(a) All components of the roof bolt assembly shall comply with the American national standards institute, "specifications for roof bolting materials in coal mines."

(b) Roof bolts that provide support by creating a beam of laminated strata shall be of a length that assures adequate anchorage, but in no case may the length of the bolt be less than thirty inches.

(c) Roof bolts that provide support by suspending the immediate roof from a stronger overlying strata shall be of a length that permits anchoring at least twelve inches in the stronger strata.

(d) Bearing plates used directly against the mine roof shall be not less than six inches square or of equivalent area. In exceptional cases where the mine roof is firm and not susceptible to sloughing, bearing plates five inches square or of equivalent area may be used.

(e) When wooden material such as planks, header blocks, and crossbars are used between the bearing plate and the roof for additional bearing, the use shall be limited to short life openings, not to exceed three years, unless treated. Bearing plates used in conjunction with wooden materials shall be not less than four inches square or of equivalent area.



(f) When washers are used, the shape of such washers shall conform to the shape of roof bolt head and the shape of the bearing plate and such washers shall be of sufficient strength to withstand loads up to the yield point of the roof bolt.

(2) Full roof bolting plan installation practices shall meet the following criteria:

(a) Finishing bits shall be easily identifiable by sight or feel and the diameter shall be within a tolerance of plus thirty thousandths of one inch minus zero of the manufacturer's recommended hole diameter for the anchor used.

(b) Torque ranges specified in the roof control plan shall be capable of providing roof bolt loads to within plus or minus one thousand pounds of fifty per cent of either the yield point of the roof bolt being used or the anchorage capacity of the strata, whichever is less. In no case, however, shall installed torques provide loads that exceed the yield point of the roof bolt being used or the anchorage capacity. Relationships for determining roof bolt load for torque applied are as follows:

	Expansion typeroof bolt(in inches)	Pounds of loadper foot-poundof torque
Cone neck or self-centering roof bolt		
	5/8	30
	3/4	30
Standard roof bolt without hard washer or lubricant		
	5/8	50
	3/4	40
Standard roof bolt with hard washer or lubricant		
	5/8	60
	3/4	60

(c) Each operator shall outline and describe roof bolt testing procedures to be followed in the roof control plan. The procedures to be followed shall include:



- (i) Providing and maintaining an approved, calibrated torque wrench on each roof bolting machine. An approved wrench shall be one that will indicate the actual torque on the roof bolt.
- (ii) Designating a qualified person to spot-check torques on at least twenty-five per cent of the roof bolts immediately after the working place has been fully bolted. If the majority of the installed torques fall outside the recommended range, the remaining roof bolts in the working place shall be tested. If the majority of the torques still fall outside the recommended range, necessary adjustments in the equipment used for tightening the roof bolts shall be made immediately. If, after adjustments are made and required torques are not achieved, supplementary support such as additional roof bolts, longer bolts with adequate anchorage, posts, cribs, or crossbars shall be installed.
- (iii) On a daily basis, spot-check torques on at least ten per cent of the roof bolts from the outby corner of the last open crosscut to the face and record the results. This record shall show the number of roof bolts tested, number of roof bolts below the recommended range, and the number of roof bolts above the recommended range. If results show that a majority of the roof bolts are not maintaining at least seventy per cent of the minimum torque required (fifty per cent if plates bear against wood), or have exceeded the maximum required torque by fifty per cent, supplementary support such as additional roof bolts, longer roof bolts with adequate anchorage, posts, cribs, or crossbars shall be installed until a review of the adequacy of the roof control plan is made by an authorized representative of the chief.
- (d) Devices shall be used to compensate for the angle when roof bolts are installed at angles greater than five per cent from the perpendicular to the roof line.
- (3) The roof bolting pattern shall meet the following criteria:
- (a) Roof bolt spacing either lengthwise or crosswise shall not exceed five feet.
- (b) Roof bolts shall be installed as close as possible to, but not more than five feet from, the rib before a sidecut is started.
- (c) Roof bolts shall be installed as close as possible to, but not more than five feet from, the face before starting conventional cutting or a continuous miner run.



(4) Openings shall not exceed twenty feet in width where roof bolting is the sole means of roof support.

(B) A conventional roof control plan is one in which installation of materials other than roof bolts, such as metal or wood posts, jacks, or cribs, in conjunction with wooden cap blocks (half headers), footers (sills), planks, or beams, are installed as the sole means of roof support at a face as part of the normal mining cycle. The following criteria apply to conventional roof control plans:

(1) Support materials shall meet the following specifications:

(a) Posts shall be of solid, straight-grain wood with the ends sawed square and free from defects that would affect their strength.

(b) The diameter of round posts shall not be less than one inch for each fifteen inches of length, but in no case shall the diameter be less than four inches; split posts shall have a cross-sectional area equal to that required for round posts to equivalent length.

(c) Wooden cap blocks and footers shall have flat paralleled sides and be not less than two inches thick, four inches wide, and twelve inches long.

(d) Wooden crossbars and planks shall be straight and of solid wood. Crossbars shall have a minimum cross-sectional area of twenty-four square inches and the minimum thickness shall be three inches. Planks shall have a minimum cross-sectional area of eight square inches and a minimum thickness of one inch.

(e) Cribbing material shall be of wood having parallel flat sides. In no case may the crib be less than thirty inches square.

(2) Conventional roof control plan installation practices shall meet the following criteria:

(a) No more than two wooden wedges shall be used to install a post.



(b) Posts shall not be installed under roof susceptible to sloughing or under disturbed roof without a wooden cap block, plank, or crossbar between the post and the roof.

(c) Posts shall be installed tight and on solid footing.

(d) Blocks used for lagging between the roof and wooden crossbars, planks, or metal bars shall be spaced so that the load on the supports will be equally distributed.

(e) Cap blocks shall be used between jacks and the roof.

(3) The support pattern shall meet the following criteria:

(a) Spacing of roadway roof supports shall not exceed five feet.

(b) Width of roadways shall not exceed fourteen feet on the straight and sixteen feet on the curves.

(c) Roof supports shall be installed to within five feet of the uncut face; however, the supports nearest the face may be removed to facilitate the operation of face equipment if equivalent temporary support is installed prior to removal.

(d) When an opening is no longer needed for storing supplies or for travel of equipment, the roof at the entrance of all such openings along travelways shall be supported by extending the post line across the opening.

(4) Openings shall not exceed twenty feet in width where the roof is supported solely by conventional means.

(C) The following criteria apply to combination roof control plans. For a plan where both roof bolts and conventional supports are used for roof control at the face, the criteria for a full roof bolting plan and a conventional roof control plan shall apply with the following modifications:

(1) Any place being driven over twenty feet in width shall be supported in compliance with a combination roof control plan.



(2) The roadway shall be limited to sixteen feet in width on both the straight and the curves to within ten feet of the uncut face.

(3) A row of posts shall be set for each five feet of space between the roadway posts and the ribs.

(4) Openings shall not exceed thirty feet in width.

(D) The following criteria apply to spot roof bolting plans. Spot roof bolting may be used only as a supplement to the approved roof control plan at random locations where adverse roof conditions are encountered. Where spot roof bolting is used, the criteria in divisions (A)(1) and (2) of this section shall apply. In addition, roof bolts shall be installed in accordance with roof conditions, but in no case shall spacing exceed four feet lengthwise and crosswise. Roof bolting shall begin under safe roof and continue for the length of the adverse roof condition until safe roof is again encountered.

(E) The following criteria apply to pillar recovery plans. Any reduction in pillar size during second mining or intentional retreat mining shall be considered pillar recovery:

(1) Division (A), (B), or (C) of this section shall apply depending on whether the pillar recovery plan calls for conventional support or a combination of conventional support and roof bolting.

(2) During development, the size and shape of the pillars shall be dictated by the depth of cover, height of coal, and other conditions associated with the coal bed. The smallest dimension of the pillar may not be less than twenty feet.

(3) Pillar splits and lifts may not exceed twenty feet in width.

(4) A minimum of two rows of breaker posts or the equivalent shall be installed on not more than four foot centers across each opening leading into pillared areas and such posts shall be installed before production is started. Such posts shall be installed near the breakline between the lift being started and the gob.

(5) A row of roadside-radius (turn) posts or the equivalent shall be installed on not more than four



foot centers leading into pillar splits, including secondary splits in slabs, wings, or fenders.

(6) The width of the roadway leading from the solid pillars to a final stump (pushout) may not exceed fourteen feet. At least two rows of posts or their equivalent shall be set on each side of the roadway on not more than four foot centers. Only one open roadway leading to a final stump (pushout) may be permitted.

(7) Before full pillar recovery is begun in areas where roof bolts were used as the sole means of roof support and openings are more than sixteen feet wide, supplementary support shall be installed on either side on not more than four foot centers lengthwise, and the width of all roadways may not exceed sixteen feet. These supports shall be extended from the entrance to the split for at least one full pillar outby the pillar in which the split is being made.

(8) The following criteria shall apply to open end pillaring:

(a) At least two rows of breaker posts or their equivalent shall be installed between the lift being started and the gob on not more than four foot centers before the initial cut is made and shall be extended to within seven feet of the face. The width of the roadway may not exceed fourteen feet.

(b) If the roof in open end pillaring has a tendency to hang, falls shall be made, or cribs installed in addition to the breakline posts between the active lift and the hanging area. The cribs may be set not more than eight feet apart. Heavy duty hydraulic jacks set at centers close enough to give equivalent support may be substituted for cribs, if such jacks are removed remotely.

(F) The following criteria apply to special roof control plans. A special roof control plan shall be adopted and followed when support is installed on an intermittent basis, but only at predetermined locations, such as at intersections, or when equipment is especially designed to provide either natural or artificial support as the coal is mined. Special roof control plans also cover experimental installations using new devices, materials, or methods for roof support.

(1) The following criteria apply to mining methods using continuous miners with integral roof bolting equipment where roof bolts are the sole means of roof support.



(a) The distance between roof bolts shall not exceed eight feet crosswise, unless additional material such as wooden planks, wooden beams, or metal straps are installed in conjunction with the roof bolts. Roof bolts installed more than eight feet, but less than nine feet apart shall be supplemented with a wooden plank at least two inches thick by eight inches wide or its equivalent. Roof bolts installed more than nine feet, but less than ten feet apart shall be supplemented with a wooden plank at least three inches thick by eight inches wide or its equivalent. Roof bolts may not be installed more than ten feet apart.

(b) Work in intersections, pillar splits, or other such places may not be started until additional support has been installed where the roof is supported with only two roof bolts crosswise. Such support shall reduce bolt spacing to a maximum of five feet.

(c) The maximum opening width where the roof may be supported by only two roof bolts crosswise is sixteen feet.

(d) The distance between the last row of bolts and the face may not exceed the distance from the head of the machine to the integral roof bolting equipment before starting a continuous miner run.

(2) Before any new support materials, devices, or systems are used as a sole means of roof support, their effectiveness shall be demonstrated by experimental installations in areas approved by the chief.

(G) The following criteria apply to temporary supports:

(1) The following criteria apply to the installation of temporary supports in faces:

(a) In areas where permanent artificial support is required temporary support shall be used until such permanent support is installed.

(b) Only those persons engaged in installing temporary support may be allowed to proceed beyond the last permanent support until such temporary supports are installed.

(c) A minimum of two temporary supports shall be installed on not more than five foot centers and



within five feet of the rib or face when work is being done between such support and the nearest rib or face. At least four temporary supports shall be installed on not more than five foot centers when work is being done in other areas of the face in by the last permanent support. No person may be permitted to proceed beyond temporary support in any direction unless such support is within five feet of the rib face or permanent support.

(2) During rehabilitation work such as rebolting, installing crossbars, or other permanent roof support, taking down loose roof, and cleaning up falls of roof, temporary roof supports shall be installed and the following criteria shall apply:

(a) Where rebolting work is being done or crossbars are being installed, at least two rows of temporary supports on not more than five foot centers shall be installed across the place so that the work in progress is done between the installed temporary supports and permanent roof supports installed in sound roof. The distance between the permanent supports and the nearest temporary supports may not exceed five feet.

(b) Tools used to take down loose material shall be of a design that will enable workers to perform their duties from a safe position without exposure to falling material. Where loose material is being taken down, a minimum of two temporary supports on centers of not more than five feet shall be set between the workers and the material if such work cannot be done from an area supported by permanent roof supports.

(c) Where roof falls have occurred, a minimum of four temporary supports shall be set before starting any work in and around the affected area. These supports shall be located so as to provide the maximum protection for persons working in the area.

(H) Any operator who intends to recover roof supports shall include a detailed plan for such recovery in the roof control plan. The following criteria apply to recovery procedures:

(1) Recovery shall be done only under the direct supervision of a general mine foreperson, mine foreperson, or section foreperson.

(2) Except where circumstances preclude such assignment, only experienced miners shall be



assigned to such work.

(3) The person supervising recovery shall make a careful examination and evaluation of the roof and designate each support to be recovered.

(4) Supports may not be recovered in the following areas:

(a) Where roof fractures are present or there are other indications of the roof being structurally weak;

(b) Where any second mining has been done;

(c) Where torque readings on roof bolts or visual observations of conventional support indicate excessive loading.

(5) Two rows of temporary supports on not more than four foot centers, lengthwise and crosswise, shall be set across the place, beginning not more than four feet in by the support being recovered. In addition, at least one temporary support shall be provided as close as practicable to the support being recovered.

(6) Temporary supports used may not be recovered unless recovery is done remotely from under roof where the permanent supports have not been disturbed and two rows of temporary support, set across the place on four foot centers, are maintained at all times between the workers and the unsupported area.

(7) No one may be permitted to enter any area from which supports have been recovered.

(8) Entrances to the areas from which supports are being recovered shall be marked with danger signs placed at conspicuous locations. The danger signs shall suffice as long as further support recovery work is being done in the area. If the recovery work is completed or suspended for three or more days, the areas shall be barricaded.

(I) No person shall refuse or neglect to comply with this section.