

WEST VIRGINIA  
SECRETARY OF STATE

KEN HECHLER

ADMINISTRATIVE LAW DIVISION

Form #5

FILED

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OFFICE OF THE SECRETARY OF STATE

NOTICE OF AGENCY ADOPTION OF A PROCEDURAL OR INTERPRETIVE RULE  
OR A LEGISLATIVE RULE EXEMPT FROM LEGISLATIVE REVIEW

AGENCY: Board of Coal Mine Health and Safety TITLE NUMBER: 36

CITE AUTHORITY: WV 22A-1A-2 and 22-6-4

RULE TYPE: PROCEDURAL XX INTERPRETIVE \_\_\_\_\_

EXEMPT LEGISLATIVE RULE YES

CITE STATUTE(S) GRANTING EXEMPTION FROM LEGISLATIVE REVIEW

22A-1A-2 and 22-6-4

AMENDMENT TO AN EXISTING RULE: YES XX, NO \_\_\_\_\_

IF YES, SERIES NUMBER OF RULE BEING AMENDED: 10

TITLE OF RULE BEING AMENDED: Rules and Regulations Governing  
Roof Control.

IF NO, SERIES NUMBER OF NEW RULE BEING ADOPTED: \_\_\_\_\_

TITLE OF RULE BEING ADOPTED: \_\_\_\_\_

THE ABOVE RULE IS HEREBY ADOPTED AND FILED WITH THE SECRETARY OF STATE. THE  
EFFECTIVE DATE OF THIS RULE IS July 15, 1996

Ronald L. Harris

6-40

**APPENDIX B**

**FISCAL NOTE FOR PROPOSED RULES**

**Rule Title:** Title 36, Series 10, Rules and Regulations Governing Roof Control  
**Type of Rule:** XX Legislative      Interpretive      Procedural  
**Agency** Board of Coal Mine Health and Safety  
**Address** 1591 Washington Street, E.  
Charleston, WV 25311

**1. Effect of Proposed Rule**

	ANNUAL FISCAL YEAR				
	DECREASE	DECREASE	CURRENT	NEXT	HEREAFTER
<b><u>ESTIMATED TOTAL COST</u></b>	\$	\$	\$	\$	\$
PERSONAL SERVICES	N/A				
CURRENT EXPENSE	N/A				
REPAIRS & ALTERATIONS	N/A				
EQUIPMENT	N/A				
OTHER	N/A				

**2. Explanation of above estimates:** N/A

**3. Objectives of these rules:** To provide controls on all boom feed roof bolting machines utilizing fast feed. These controls will be designed by the equipment manufacturer, and approved by the Director of the Office of Miners' Health, Safety and Training, to minimize the roof bolter operators' exposure to the pinch point area while engaging the fast feed function. The fast feed will be designed in such a manner that will minimize accidental activation.

Rule Title: Title 36, Series 10 - Rules and Regulations Governing Roof Control

4. Explanation of Overall Economic Impact of Proposed Rule.

A. Economic Impact on State Government.

N/A

B. Economic Impact on Political Subdivisions; Specific Industries; Specific groups of Citizens.

N/A

C. Economic Impact on Citizens/Public at Large.

N/A

Date: January 3, 1996

Signature of Agency Head or Authorized Representative

Ronald L. Harris

Summary:

As a result of two (2) fatal mine accidents in which the roof bolter machine operators were caught between the boom and the A.T.R.S. or the roof the Board, in reviewing the fatalities, felt that a safety design could be developed by the equipment manufacturers to minimize the exposure of the roof bolt machine operator to the pinch point area. The regulation applies to roof bolt machines utilizing fast feed. Fast feed is defined as a feed rate greater than twelve (12) inches per second. The Board feels that this design will decrease the chance of having a similar fatality. The Board worked with the roof bolter machine manufacturing companies in developing this regulation.

RHarris:lgh

TITLE 36  
LEGISLATIVE RULES  
BOARD OF COAL MINE HEALTH AND SAFETY

FILED

JAN 11 1 13 PM '96

SERIES 10  
RULES AND REGULATIONS GOVERNING  
ROOF CONTROL

OFFICE OF WEST VIRGINIA  
SECRETARY OF STATE

§36-10-1. General.

1.1. Scope. -- This series sets for requirements for controlling roof, face, and ribs, including coal or rock bursts, in underground coal mines. Roof Control systems installed prior to the effective date of this series are not affected so long as the support system continues to effectively control the roof, face and ribs.

1.2. Authority. -- W. Va. Code §§22A-1A-2 and 22-6-4

1.3. Filing Date. -- January 10, 1996

1.4. Effective Date. -- July 15, 1996

1.5. Repeal of Former Rule. -- This rule repeals and replaces West Virginia Department of Miner's Health, Safety, and Training Rules, Title 56, Series 10, effective May 1, 1988; West Virginia Board of Coal Mine Health and Safety Rules, Title 36, Series 10 effective March 1, 1981; and Title 36 Series 25 effective August 10, 1987.

§36-10-2. Definitions.

As used in these regulations, unless used in a context that clearly requires a different meaning, the term:

2.1. Adopted approved roof control plan - The roof control plan and revisions thereof suitable to the roof conditions and mining systems of each coal mine which has been adopted by the mine and approved by the Director pursuant to W. Va. Code §22A-2-25.

2.2. Approved - In strict compliance with mining law, or in the absence of law, accepted by a recognized standardizing body or organization where approval is generally recognized as authoritative on the subject.

2.3. Automated temporary roof support system - The devices and mechanisms, including the ATRS, used, and methods followed by which the ATRS is activated and set to support the roof.

2.2. Automated temporary roof support or ATRS - A mechanical device used to support the roof temporarily.

2.5. Director - The Director of the West Virginia Office of Miners' Health, Safety and Training.

2.6. Pillar recovery - Any reduction in pillar size during retreat mining.

§36-10-3. Protection From Falls of Roof, Face and Ribs.

3.1. The roof, face and ribs of areas where persons work or travel shall be supported or otherwise controlled to protect persons from hazards related to falls of the roof, face, or ribs and coal or rock bursts.

3.2. No person shall work or travel under unsupported roof unless in accordance with this Series.

§36-10-4. Mining Methods.

4.1. The method of mining shall not expose any person to hazards caused by excessive widths of rooms, crosscuts and entries, or faulty pillar recovery methods. Pillar dimensions shall be compatible with effective control of the roof, face, and ribs and coal or rock bursts.

4.2. A sightline or other method of directional control shall be used to maintain the projected direction of mining in entries, rooms, crosscuts, and pillar splits.

4.3. A sidecut shall be started only from an area that is supported in accordance with the roof control plan.

4.4. A working face shall not be mined through into an unsupported area of active workings, except when the unsupported area is inaccessible.

4.5. Additional roof support shall be installed where:

4.5.1. The width of the opening specified in the roof control plan is exceeded by more than twelve (12) inches; and

4.5.2. The distance over which the excessive width exists is more than five (5) feet.

§36-10-5. Roof Bolting.

5.1. For roof bolts and accessories addressed in ASTM F432-88, "Standard Specification for Roof and Rock Bolts and Accessories", the mine operator shall:

5.1.1. Obtain a manufacturer's certification that the material was manufactured and tested in accordance with the specifications of ASTM F432-88; and

5.1.2. Make this certification available to an authorized representative of the Director.

5.2. Roof bolts and accessories not addressed in ASTM F432-88 may be used, provided that the use of such materials is approved by the Director or his authorized representative based on:

5.2.1. Demonstrations which show that the materials have successfully supported the roof in an area of a coal mine with similar strata, opening dimensions and roof stresses; or

5.2.2. Tests have shown the materials to be effective for supporting the roof in an area of the affected mine which has similar strata, opening dimensions and roof stresses as the area where the roof bolts are to be used. During the test process, access to the test area shall be limited to persons necessary to conduct the test.

5.3.1. A bearing plate shall be firmly installed with each roof bolt.

5.3.2. Bearing plates used directly against the mine roof shall be at least six (6) inches square or the equivalent, except that where the mine roof is firm and not susceptible to sloughing, bearing plates five (5) inches square or the equivalent may be used.

5.3.3. Bearing plates used with wood or metal materials shall be at least four (4) inches square or the equivalent.

5.3.4. Wooden materials that are used between a bearing plate and the mine roof in areas which will exist for three (3) years or more shall be treated to minimize deterioration.

5.4. When washers are used with roof bolts, the washers shall conform to the shape of the roof bolt head, and bearing plate.

5.5.1. The diameter of finishing bits shall be within a tolerance of plus or minus 0.030 inch of the manufacturer's recommended hole diameter for the anchor used.

5.5.2. When separate finishing bits are used, they shall be distinguishable from other bits.

#### 5.6. Tensioned roof bolts:

5.6.1. Roof bolts that provide support by creating a beam of laminated strata shall be at least thirty (30) inches long. Roof bolts that provide support by suspending the roof from overlying stronger strata shall be long enough to anchor at least twelve (12) inches into the stronger strata.

5.6.2. Test holes, spaced at intervals specified in the roof control plan, shall be drilled to a depth of at least twelve (12) inches above the anchorage horizon of mechanically anchored tensioned bolts being used. When a test hole indicates that bolts would not anchor in competent strata, corrective action shall be taken.

5.6.3. The installed torque or tension ranges for roof bolts as specified in the roof control plan shall maintain the integrity of the support system and shall not exceed the yield point of the roof bolt nor anchorage capacity of the strata.

5.6.4. In each roof bolting cycle, the actual torque or tension of the first tensioned roof bolt installed with each drill head shall be measured immediately after it is installed. Thereafter, for each drill head used, at least one (1) roof bolt out of every four (4) installed shall be measured for actual

torque or tension. If the torque or tension of any of the roof bolts measured is not within the range specified in the roof control plan, corrective action shall be taken.

5.6.5. In working places from which coal is produced during any portion of a twenty-four (24) hour period, the actual torque or tension on at least one (1) out of every ten (10) previously installed mechanically anchored tensioned roof bolts shall be measured from the outby corner of the last open crosscut to the face in each advancing section. Corrective action shall be taken if the majority of the bolts measured:

a. Do not maintain at least seventy percent (70%) of the minimum torque or tension specified in the roof control plan, fifty percent (50%) if the roof bolt plates bear against wood; or

b. Have exceeded the maximum specified torque or tension by fifty percent (50%).

5.6.6. The mine operator or a person designated by the operator shall certify by signature and date that measurements required by subsection 5.6.5 of this section have been made. This certification shall be maintained for at least one (1) year and shall be made available to an authorized representative of the Director and representatives of the miners.

5.6.7. Tensioned roof bolts installed in the roof support pattern shall not be used to anchor trailing cables or used for any other purpose that could affect the tension of the bolt. Hanging trailing cables, line brattice, telephone lines, or other similar devices which do not place sudden loads on the bolts are permitted.

5.6.8. Angle compensating devices shall be used to compensate for the angle when tensioned roof bolts are installed at angles greater than five (5) degrees from the perpendicular to the bearing plate.

5.7. Non-tensioned grouted roof bolts. The first non-tensioned grouted roof bolt installed during each roof bolting cycle shall be tested during or immediately after the first row of bolts has been installed. If the bolt tested does not withstand at least one hundred fifty (150) foot-pounds of torque without rotating in the hole, corrective action shall be taken.

5.8. Removal of Roof Hazards. Prior to or during bolting operations in working places, the person responsible for performing such work shall immediately notify a supervisor if abnormal or hazardous conditions are encountered. No further work shall be performed until a supervisor examines the area where he has been informed that abnormal or hazardous conditions exist and directs the correction of such condition.

5.9. Working Around Roof Bolting Machines. On all roof bolting machines except continuous mining machines with integral roof bolters, during the time that the ATRS system is being engaged against or retracted from the mine roof, all persons except those specified below shall be outby the last row of

permanent roof supports. This requirement shall not apply to the equipment operator, provided that adequate protection is provided for the equipment operator while setting the ATRS.

5.10. Roof Bolting Machines - Requirements. Roof bolting machines used in seams forty-eight (48) inches or higher shall be equipped with a mechanical means of holding the drill steel during drilling operations, which minimizes the need for the equipment operator to handle the drill steel. The Director may require such devices on roof bolting machines used in seams under forty-eight (48) inches where the technology for such equipment to operate under these conditions is available.

5.11. Fast raise on boom feed roof bolting machines: All boom feed roof bolting machines utilizing fast feed will be provided with controls that are designed by the equipment manufacturer and approved by the Director of the Office of Miners' Health, Safety and Training that minimize, the operators' exposure to the pinch point area, while engaging the fast feed function. The fast feed will be designed in such a manner that minimizes accidental activation. Fast feed is defined as a feed rate greater than twelve (12) inches per second.

#### §36-10-6. Installation of Roof Support Using Mining Machines with Integral Roof Bolters.

When roof bolts are installed by a continuous mining machine with integral roof bolting equipment:

6.1. The distance between roof bolts shall not exceed ten (10) feet crosswise.

6.2. Roof bolts to be installed nine (9) feet or more apart shall be installed with a wooden crossbar at least three (3) inches thick and eight (8) inches wide, or material which provides equivalent support.

6.3. Roof bolts to be installed more than eight (8) feet but less than nine (9) feet apart shall be installed with a wooden plank at least two (2) inches thick and eight (8) inches wide, or material which provides equivalent support.

#### §36-10-7. Conventional roof support.

7.1. When conventional roof support materials are used as the only means of support:

7.1.1. The width of any opening shall not exceed twenty (20) feet;

7.1.2. The spacing of roadway roof support shall not exceed five (5) feet;

a. Supports shall be installed to within five (5) feet of the uncut face;

b. When supports nearest the face must be removed to facilitate the operation of face equipment, equivalent temporary

support shall be installed prior to removing the supports;

7.1.4. Straight roadways shall not exceed sixteen (16) feet wide where full overhead support is used and fourteen (14) feet wide where only posts are used;

7.1.5. Curved roadways shall not exceed sixteen (16) feet wide; and

7.1.6. The roof at the entrance of all openings along travelways which are no longer needed for storing supplies or for travel of equipment shall be supported by extending the line of support across the opening.

7.2. Conventional roof support materials shall meet the following specifications:

7.2.1. The minimum diameter of cross-sectional area of wooden posts shall be as follows:

Post length (in inches)	Diameter of round posts (in inches)	Cross Sectional area of split posts (in inches)
60 or less	4	13
Over 60 to 84	5	20
Over 84 to 108	6	28
Over 108 to 132	7	39
Over 132 to 156	8	50
Over 156 to 180	9	64
Over 180 to 204	10	79
Over 204 to 228	11	95
Over 228	12	113

7.2.2. Wooden materials used for support shall have the following dimensions:

a. Cap blocks and footings shall have flat sides and be at least two (2) inches thick, four (4) inches wide and twelve (12) inches long.

b. Crossbars shall have a minimum cross-sectional area of twenty-four (24) square inches and be at least three (3) inches thick.

c. Planks shall be at least six (6) inches wide and one (1) inch thick.

7.2.3. Cribbing materials shall have at least two (2) parallel flat sides.

7.3. A cluster of two (2) or more posts that provide equivalent strength may be used to meet the requirements of paragraph (b)(1) of this section, except that no post shall have

a diameter less than four (4) inches or have a cross-sectional area less than thirteen (13) square inches.

7.4. Materials other than wood used for support shall have support strength at least equivalent to wooden material meeting the applicable provisions of this section.

7.5. Posts and jacks shall be tightly installed on solid footing.

7.6. When posts are installed under roof susceptible to sloughing a cap block, plank, crossbar, or materials that are equally effective shall be placed between the post and the roof.

7.7. Blocks used for lagging between the roof and crossbars shall be spaced to distribute the load.

7.8. Jacks used for roof support shall be used with at least thirty-six (36) square inches of roof bearing surface.

#### §36-10-8. Pillar recovery.

Pillar recovery shall be conducted in the following manner, unless otherwise specified in the roof control plan:

8.1. Full and partial pillar recovery shall not be conducted on the same pillar line, except where physical conditions such as unstable floor or roof, falls of roof, oil and gas well barriers or surface subsidence require that pillars be left in place.

8.2. Before mining is started in a pillar split or lift:

8.2.1. At least two (2) rows of breaker posts or equivalent support shall be installed --

a. As close to the initial intended breakline as practicable; and

b. Across each opening leading into an area where full or partial pillar extraction has been completed.

8.2.2. A row of roadside-radius (turn) posts or equivalent support shall be installed leading into the split or lift.

8.3. Before mining is started on a final stump:

8.3.1. At least two (2) rows of posts or equivalent support shall be installed on not more than four (4) - foot centers on each side of the roadway; and

8.3.2. Only one (1) open roadway, which shall not exceed sixteen (16) feet wide, shall lead from solid pillars to the final stump of a pillar. Where posts are used as the sole means of roof support, the width of the roadway shall not exceed fourteen (14) feet.

8.4. During open-end pillar extraction, at least two (2) rows of breaker posts or equivalent support shall be installed on not

more than four (4) - foot centers. These supports shall be installed between the lift to be started and area where pillars have been extracted. These supports shall be maintained to within seven (7) feet of the face and the width of the roadway shall not exceed sixteen (16) feet. Where posts are used as the sole means of roof support, the width of the roadway shall not exceed fourteen (14) feet.

8.5. Overlays and underlays of the area to be mined shall be reviewed by the Director or his representative, and the mine operator during the required periodic review of the approved roof control plan as required by W. Va. Code §22A-2-25(a) at any mine where pillar recovery is being performed.

8.6. During pillar extraction all non-essential personnel shall remain outby the last open cross-cut of the place where coal is being removed.

8.7. In mines where pillar extraction (second mining) has not been previously performed, the following requirements shall be met before pillaring is begun:

8.7.1. The operator shall review the provisions of the approved roof control plan concerning pillar extraction with all persons to be performing such work, immediately prior to the start of such work.

8.7.2. The operator shall notify the district inspector in whose district the mine is located five (5) working days prior to the date pillaring is to begin. When deemed necessary the district inspector may require that he be present during the review of the approved roof control plan, provided that he can be present before pillaring is to begin.

#### §36-10-9. Warning devices.

Except during the installation of roof supports, the end of permanent roof support shall be posted with a readily visible warning, or a physical barrier shall be installed to impede travel beyond permanent support.

#### §36-10-10. Automated Temporary Roof Support Systems.

10.1. All new and rebuilt roof bolting machines and continuous mining machines with integral roof drills used in a working place in a coal mine shall be provided with approved automated temporary roof support system(s): Provided, That other methods of temporarily supporting the roof may be approved by the Director in the adopted approved roof control plan.

10.2. Approved automated temporary roof support systems shall be provided on all roof bolting machines and continuous mining machines with integral roof drills used in a work place: Provided, That other methods of temporarily supporting the roof may be approved by the Director in the adopted approved roof control plan.

10.3. Automated temporary roof support systems and all other

methods of temporarily supporting the roof shall be approved on an individual mine basis by the Director and shall become part of the adopted approved roof control plan.

The operator shall, prior to any automated temporary roof support system being used underground, first obtain approval from the Director or an authorized representative of the Director, such approval to be in the manner and form prescribed by the Director: Provided, That such approval shall not be unreasonably withheld and furthermore, any automated temporary roof support system that has been "Approved" prior to the effective dates of Sections 5.1 (a) and (b), respectfully, shall also be approved by the Director or his authorized representative if the automated temporary roof support system meets the minimum requirements stated in Section 10.5 of these rules and regulations.

10.4. A waiver may be granted, as to the use of an automated temporary roof support system, by the Director where it has been demonstrated by the operator and determined during an investigation by an authorized representative of the Director that the use of an automated temporary roof support system would create a condition which will cause a greater hazard, to people working inby the area where permanent supports have been installed, than the method presently being employed or proposed by the operator for temporarily supporting the roof, or where the technology of an automated temporary roof support system does not exist to allow compliance with the requirements set forth in Section 10.5 of these rules and regulations, of the automated temporary roof support system, the Director may approve the use of temporary jacks and posts to be used in lieu thereof.

10.5. All machines using, or used as, automated temporary roof support shall comply with the following minimum requirements unless a waiver has been granted or another method of temporarily supporting the roof has been approved by the Director under Sections 10.3 and 10.4 of these rules and regulations.

10.5.1. The necessary controls to position the machine and place the ATRS against the roof shall be operated from under permanently supported roof unless the design of the system will provide adequate protection for the miner while setting such supports.

10.5.2. The ATRS shall be placed firmly against the roof before any work is performed inby permanent roof supports and shall remain against the roof while work is being done.

10.5.3. All hydraulic jacks affecting the support capacity of an ATRS shall have check valves or equivalent protection, to prevent support failure in the event of a sudden loss of hydraulic pressure.

10.5.4. ATRS used in conjunction with single bolt installation are required to elastically support, at a minimum, a deadweight load of eleven thousand two hundred fifty (11,250) pounds for each five (5) foot by five (5) foot square area of the roof intended to be supported.

10.5.5. ATRS consisting of pads and/or crossbars used in single or multiple rows must elastically support, at a minimum, a deadweight load in pounds of  $450 \times (L + 5) \times (W + 5)$ ; where L is the length of the support structure from tip to tip and W is the width taken at the center line of a support structure to the center line of another support structure.

10.5.6. The actual capacity to support elastically a deadweight load shall be certified by a registered professional engineer.

10.5.7. The distance that the ATRS may be set in by the last row of permanent supports shall be dependent on the spacing requirements of the permanent roof supports and must be approved by the Director in the adopted approved roof control plan.

10.5.8. No person shall work or travel beyond the ATRS unless the distance between the coal face and the ATRS is five (5) feet or less; in addition, no person shall work or travel left or right of the ATRS unless a coal rib, a permanent support, or a temporary support is within five (5) feet of the ATRS: Provided, That when such five (5) foot limit is being determined for an ATRS consisting of a ring then said five (5) foot limit shall be determined from the center of the ring.

10.5.9. The inch tram control speed of a roof bolting machine shall not exceed one-half ( $1/2$ ) of the maximum tram control speed: Provided, That in no case shall the inch tram control speed exceed eighty (80) feet per minute when the roof bolting machine is being used to establish the ATRS.

#### §36-10-11. Manual Installation of Temporary Support.

11.1. When manually installing temporary support, only persons engaged in installing the support shall proceed beyond permanent support.

11.2. When manually installing temporary supports, the first temporary support shall be set no more than five (5) feet from a permanent roof support and the rib. All temporary supports shall be set so that the person installing the supports remains between the temporary support being set and two (2) other supports which shall be no more than five (5) feet from the support being installed. Each temporary support shall be completely installed prior to installing the next temporary support.

11.3. All temporary supports shall be placed on no more than five (5) foot centers.

11.4. Once temporary supports have been installed, work or travel beyond permanent roof support shall be done between temporary supports and the nearest permanent support or between other temporary supports.

#### §36-10-12. Roof Testing and Scaling.

12.1. A visual examination of the roof, face, and ribs shall be made immediately before any work is started in an area and

thereafter as conditions warrant.

12.2. Where the mining height permits and the visual examination does not disclose a hazardous condition, sound and vibration roof tests, or other equivalent tests, shall be made where supports are to be installed. When sound and vibration tests are made, they shall be conducted:

12.2.1. After the ATRS system is set against the roof and before other support is installed; or

12.2.2. Prior to manually installing a roof support. This test shall begin under supported roof and progress no further than the location where the next support is to be installed.

12.3. When a hazardous roof, face, or rib condition is detected, the condition shall be corrected before there is any other work or travel in the affected area. If the affected area is left unattended, each entrance to the area shall be posted with a readily visible warning, or a physical barrier shall be installed to impede travel into the area.

12.4. A bar for taking down loose materials shall be available in the working place or on all face equipment except haulage equipment. Bars provided for taking down loose material shall be of a length and design that will allow the removal of loose material from a position that will not expose the person performing this work to injury from falling material.

#### §36-10-13. Rehabilitation of Areas With Unsupported Roof.

13.1. Before rehabilitating each area where a roof fall has occurred or the roof has been removed by mining machines or by blasting:

13.1.1. The mine operator shall establish the clean up and support procedures that will be followed;

13.1.2. All persons assigned to perform rehabilitation work shall be instructed in the clean-up and support procedures; and

13.1.3. Ineffective, damaged, or missing roof support at the edge of the area to be rehabilitated shall be replaced or other equivalent support installed.

13.2. All persons who perform rehabilitation work shall be experienced in this work or they shall be supervised by a person experienced in rehabilitation work who is designated by the mine operator.

13.3. Where work is not being performed to rehabilitate an area in active workings where a roof fall has occurred or the roof has been removed by mining machines or by blasting, each entrance to the area shall be supported by at least one (1) row of posts on not more than five (5) foot centers, or equally effective support.

§36-10-14. Roof Support Removal.

14.1.1. All persons who perform the work of removing permanent roof support shall be supervised by a management person experienced in removing roof supports.

14.1.2. Only persons with at least one (1) year of underground mining experience shall perform permanent roof support removal work.

14.2. Prior to the removal of permanent roof supports, the person supervising roof removal in accordance with paragraph 14.1.1 of this section shall examine the roof conditions in the area where the supports are to be removed and designate each support to be removed.

14.3.1. Except as provided in paragraph 14.7 of this section, prior to the removal of permanent supports, a row of temporary supports on no more than 5-foot centers or equivalent support shall be installed across the opening within four (4) feet of the supports being removed. Additional supports shall be installed where necessary to assure safe removal.

14.3.2. Prior to the removal of roof bolts, temporary support shall be installed as close as practicable to each bolt being removed.

14.4. Temporary supports installed in accordance with this section shall not be removed unless:

14.4.1. Removal is done by persons who are in a remote location under supported roof; and

14.4.2. At least two rows of temporary supports, set across the opening on no more than 5-foot centers, are maintained between the miners and the unsupported area.

14.5. Each entrance to an area where supports have been removed shall be posted with a readily visible warning or a physical barrier shall be installed to impede travel into the area.

14.6. Except as provided in paragraph 14.7 of this section, permanent support shall not be removed where:

14.6.1. Roof bolt torque or tension measurements or the condition of conventional support indicate excessive loading;

14.6.2. Roof fractures are present;

14.6.3. There is any other indication that the roof is structurally weak;

14.6.4. Pillar recovery has been conducted.

14.7. Permanent supports may be removed provided that:

14.7.1. Removal is done by persons who are in a remote

location under supported roof; and

14.7.2. At least two rows of temporary supports, set across the opening on no more than 5-foot centers are maintained between the miners and the unsupported area.

14.8. The provisions of this section do not apply to removal of conventional supports for starting crosscuts and pillar splits or lifts except that prior to the removal of these supports an examination of the roof conditions shall be made.

#### §36-10-15. Supplemental Support Materials, Equipment and Tools.

15.1. A supply of supplementary roof support materials and the tools and equipment necessary to install the materials shall be available at a readily accessible location on each working section or within four (4) crosscuts of each working section.

15.2. -- The quantity of support materials and tools and equipment maintained available in accordance with this section shall be sufficient to support the roof if adverse roof conditions are encountered, or in the event of an accident involving a fall.

#### §36-10-16. Roof Control Plan.

16.1.1. Each mine operator shall develop and follow a roof control plan, approved by the Director that is suitable to the prevailing geological conditions, and the mining system to be used at the mine. Additional measures shall be taken to protect persons if unusual hazards are encountered.

16.1.2. The proposed roof control plan and any revisions to the plan shall be submitted, in writing, to the Director. When revisions to a roof control plan are proposed, only the revised pages need to be submitted unless otherwise specified by the Director.

16.2.1. The mine operator will be notified in writing of the approval or denial of approval of a proposed roof control plan or proposed revision.

16.2.2. When approval of a proposed plan or revision is denied, the deficiencies of the plan or revision and recommended changes will be specified and the mine operator will be afforded an opportunity to discuss the deficiencies and changes with the roof control inspectors or the Director.

16.2.3. Before new support materials, devices or systems other than roof bolts and accessories, are used as the only means of roof support, the Director may require that their effectiveness be demonstrated by experimental installations.

16.3. No proposed roof control plan or revision to a roof control plan shall be implemented before it is approved.

16.4. Before implementing an approved revision to a roof control plan, all persons who are affected by the revision shall

be instructed in its provisions.

16.5. The approved roof control plan and any revisions shall be available to the miners and representative of miners at the mine.

§36-10-17. Roof control plan information.

17.1. The following information shall be included in each roof control plan:

17.1.1. The name and address of the company.

17.1.2. The name, address, mine identification number, and location of the mine.

17.1.3. The name and title of the company official responsible for the plan.

17.1.4. A typical columnar section of the mine strata which shall:

a. Show the name and the thickness of the coalbed to be mined and any persistent partings;

b. Identify the type and show the thickness of each stratum up to and including the main roof above the coalbed and for distance of at least ten (10) feet below the coalbed; and

c. Indicate the maximum cover over the area to be mined.

17.1.5. A description and drawings of the sequence of installation and spacing of supports for each method of mining used.

17.1.6. When an ATRS system is used, the maximum distance that an ATRS system is to be set beyond the last row of permanent support.

17.1.7. When tunnel liners or arches are to be used for roof support, specifications and installation procedures for the liners or arches.

17.1.8. Drawings indicating the planned width of openings, size of pillars, method of pillar recovery, and the sequence of mining pillars.

17.1.9. A list of all support materials required to be used in the roof, face, and rib control system, including, if roof bolts are to be installed:

a. The length, diameter, grade and type of anchorage unit to be used;

b. The drill hole size to be used; and

c. The installed torque or tension range for tensioned roof bolts.

17.1.10. When mechanically anchored tensioned roof bolts are used, the intervals at which test holes will be drilled.

17.1.11. A description of the method of protecting persons:

- a. From falling material at drift openings; and
- b. When mining approaches within one hundred fifty (150) feet of an outcrop.

17.2. Each drawing submitted with a roof control plan shall contain a legend explaining all symbols used and shall specify the scale of the drawing which shall not be less than five (5) feet to the inch or more than twenty (20) feet to the inch.

17.3. All roof control plan information, including drawings, shall be submitted on 8 1/2 by 11 inch paper, or paper folded to this size.

#### §36-10-18. Roof Control Plan-Approved Criteria.

18.1. This section sets forth the criteria that shall be considered on a mine-by-mine basis in the formulation and approval of roof control plans and revisions. Additional measures may be required in plans by the Director or his authorized representative. Roof control plans that do not conform to the applicable criteria in this section may be approved by the Director or his authorized representative, provided that effective control of the roof, face, and ribs can be maintained.

#### 18.2. Roof bolting.

18.2.1. Roof bolts should be installed on centers not exceeding five (5) feet lengthwise and crosswise, except as specified in Section 6.

18.2.2. When tensioned roof bolts are used as a means of roof support, the torque or tension range should be capable of supporting roof bolt loads of at least fifty percent (50%) of either the yield point of the bolt or anchorage capacity of the strata, whichever is less.

18.2.3. Any opening that is more than twenty (20) feet wide should be supported by a combination of roof bolts and conventional supports.

18.2.4. In any opening more than twenty (20) feet wide:

- a. Posts should be installed to limit each roadway to sixteen (16) feet wide where straight and eighteen (18) feet wide where curved; and

- b. A row of posts should be set for each five (5) feet of space between the roadway posts and the ribs.

18.2.5. Openings should not be more than thirty (30) feet

wide.

18.3. Installation of roof support using mining machines with integral roof bolters.

18.3.1. Before an intersection or pillar split is started, roof bolts should be installed on at least five (5) foot centers where the work is performed.

18.3.2. Where the roof is supported by only two (2) roof bolts crosswise, openings should not be more than sixteen (16) feet wide.

18.4. Pillar recovery.

18.4.1. During development, any dimension of a pillar should be at least twenty (20) feet.

18.4.2. Pillar splits and lifts should not be more than twenty (20) feet wide.

18.4.3. Breaker posts should be installed on not more than four (4) foot centers.

18.4.4. Roadside-radius (turn) posts, or equivalent support, should be installed on not more than four (4) centers leading into each pillar split or lift.

18.4.5. Before full pillar recovery is started in areas where roof bolts are used as the only means of roof support and openings are more than sixteen (16) feet wide, at least one (1) row of posts should be installed to limit the roadway width to sixteen (16) feet. These posts should be:

a. Extended from the entrance to the split through the intersection outby the pillar in which the split or lift is being made; and

b. Spaced on not more than five (5) foot centers.

18.5. Unsupported openings at intersections. Openings that create an intersection should be permanently supported or at least one (1) row of temporary supports should be installed on not more than five (5) foot centers across the opening before any other work or travel in the intersection.

18.6. Longwall mining systems.

18.6.1. Systematic supplemental support should be installed throughout:

a. The tailgate entry of the first longwall panel prior to any mining; and

b. In the proposed tailgate entry of each subsequent panel in advance of the frontal abutment stresses of the panel being mined.

18.6.2. When a ground failure prevents travel out of the section through the tailgate side of the longwall section, the roof control plan should address:

- a. Notification of miners that the travelway is blocked;
- b. Re-instruction of miners regarding escapeways and escape procedures in the event of an emergency;
- c. Re-instruction of miners on the availability and use of self-contained self-rescue devices;
- d. Monitoring and evaluation of the air entering the longwall section;
- e. Location and effectiveness of the two-way communication systems; and
- f. A means of transportation from the section to the main line.

18.6.3. The plan provisions addressed by paragraph 18.6.2 of this section should remain in effect until a travelway is reestablished on the tailgate side of a longwall section.

#### §36-10-19. Evaluation and Revision of Roof Control Plan.

19.1. Revisions of the roof control plan shall be proposed by the operator:

19.1.1. When conditions indicate that the plan is not suitable for controlling the roof, face, ribs, or coal or rock bursts; or

19.1.2. When accident and injury experience at the mine indicates the plan is inadequate. The accident and injury experience at each mine shall be reviewed at least every six (6) months.

19.2. Each unplanned roof fall and rib fall and coal or rock burst that occurs in the active workings shall be plotted on a mine map if it:

19.2.1. Is above the anchorage zone where roof bolts are used;

19.2.2. Impairs ventilation;

19.2.3. Impedes passage of persons;

19.2.4. Causes miners to be withdrawn from the area affected; or

19.2.5. Disrupts regular mining activities for more than one (1) hour.

19.3. The mine map of which roof falls are plotted shall be available at the mine site for inspection by authorized

representatives of the Director and representatives of miners at the mine.

19.4. The roof control plan for each mine shall be reviewed every six (6) months by an authorized representative of the Director. This review shall take into consideration any falls of the roof, face, and ribs and the adequacy of the support systems used at the time.

**§36-10-20. Underground Auger Mines - Special Requirements.**

20.1. Required support systems for mine openings exceeding twenty (20) feet. In underground auger mines, the mine openings may exceed twenty (20) feet in width, provided that:

20.1.1. The mine openings do not exceed twenty-six (26) feet; and

20.1.2. A combination full roof bolting plan/conventional roof control plan shall be developed and the roof maintained in strict compliance with section 18 of this Series.