

Miners' Circular 15

DEPARTMENT OF THE INTERIOR

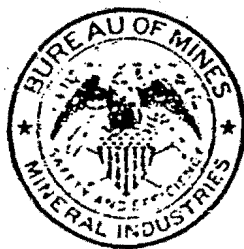
BUREAU OF MINES

JOSEPH A. HOLMES, DIRECTOR

RULES FOR  
MINE-RESCUE AND FIRST-AID FIELD CONTESTS

BY

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# RULES FOR MINE-RESCUE AND FIRST-AID FIELD CONTESTS.

By JAMES W. PAUL.

## INTRODUCTION.

The Bureau of Mines is endeavoring to promote safety and efficiency in all mining operations. The bureau recognizes, however, that accidents in connection with such operations are bound to occur, and that preparation should be made to lessen as much as possible the suffering entailed. Many mine-rescue and first-aid crews have been organized among the miners of this country and have rendered excellent service. The work of such crews is greatly stimulated by field contests or demonstrations. As the author has acted as a director or official in many demonstrations he has gained considerable experience in conducting them, and in this circular has endeavored to present simply and clearly some of the essential details.

## ORGANIZATION OF COMMITTEES.

To make a field-day meet a success there must be some organizing head that will assume the responsibility for success or failure. There are certain financial obligations in this work that in most cases call for the united effort of a few well-selected representative men to comprise an executive committee or managing board, which will have general charge, and through subcommittees perfect arrangements for every detail.

An organization as outlined below has been found adequate to meet most, if not all, emergencies in successfully conducted field contests or demonstrations:

Executive committee (board of managers): To finance the project, appoint all subcommittees, and arrange for transportation service.

Subcommittees on: Arranging for the ground and putting it in order; program of events and rules governing them;<sup>a</sup> judging the contests; awards and prizes.

The relations between the executive committee and the subcommittees can best be harmonized by having the chairman of each subcommittee a member of the executive committee.

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<sup>a</sup> This committee to have charge of the field during the contest.

## DETAILS OF CONDUCTING A FIELD CONTEST WITH RESCUE APPARATUS.

## PREPARATION OF THE FIELD.

Relative to the preparation of the field, the following suggestions are offered:

Arrange outline of entries (gangways) with  $\frac{1}{2}$ -inch rope supported on stakes 5 feet high above the ground; place crossbars across the tops of stakes. For rooms make the stakes 3 or 4 feet above the ground.

At the face of one entry have a fire, which is to be extinguished or temporarily closed off with a brattice or a stopping. At the face of a room have a miner who is to be rescued and resuscitated, and at the end of one entry a rescuer who has been injured by a fall of coal.

An air-tight smoke room, 7 feet high, 6 feet wide, and 8 feet long, should be arranged in which the rescue men may test the tightness of their apparatus before entering the mine. One end of this smoke room should be made of wood and the other end and sides of window sash fitted with glass. The wooden end should have a door  $2\frac{1}{2}$  feet wide by 6 feet high. The top should be made in two sections to facilitate easy handling. The bottom may be made smoke tight by throwing up earth. The sides and ends may be made secure by means of staples and hasps.

The committee on arranging for grounds should provide an inclosure 8 by 12 feet, roped off, and designated "emergency supply room," in which the following supplies should be provided for the use of the rescue crews:

- 2 barrels of water.
- 20 bushels of sand.
- 1 roll of brattice cloth.
- 2 pieces of hemlock, 2 inches by 4 inches by 10 feet, for each crew.
- 2 pieces of hemlock, 1 inch by 6 inches by 10 feet, for each crew.
- 10 pounds of 8-penny nails.
- 5 pounds of 20-penny nails.
- 4 hatchets.
- 2 handsaws.
- 4 two-gallon buckets.
- 6 whisk brooms.
- 1 stretcher.
- 100 feet of  $\frac{1}{2}$ -inch rope.
- 1 miners' check board with checks numbered 1 to 100.
- 1 wheelbarrow.
- 500 bricks.
- 2 trowels.
- 2 miners' picks.
- 2 miners' shovels.
- 2 canary birds.
- 2 bird cages.

A storeroom keeper should be placed in charge to issue such of the above material as may be required by the crews.

## RESCUE-CREW DRILL.

The crew should march in single file, maintaining 2-yard intervals, the captain marching at the head and at 1 yard to the right of the file before it enters the mine.

Prior to the crew putting on the apparatus and turning on the oxygen the captain will command by word of mouth.

The apparatus should be assembled at a place convenient of access, and upon command of the captain each member should procure an apparatus preparatory to wearing it.

After the apparatus has been put on all movements of the crew should be governed by means of a gong or horn. Each member should be required to have a horn or gong, all horns or all gongs being of the same tone. The captain's horn should be of a different tone or pitch.

Following is an outline of commands that may be indicated by blasts of the captain's horn for the control of the crew:

*Outline of commands to be indicated by blasts of horn.*

Number of blasts.	Command indicated.
1.....	Crew at rest start to march, captain in lead; maintain 2-yard intervals.
1.....	Crew marching, halt.
2.....	Turn on oxygen and close apparatus.
3.....	About face.
3-1.....	Each member examine and read pressure gage, holding gage for inspection by captain, who will record pressure and time of day.
4.....	Bring forward stretchers, load injured, and lift stretcher preparatory to removal to fresh air.
3-3.....	Rescue man in distress; all members go to his relief and assist to fresh air; give first-aid treatment.
2-2.....	Fire discovered; bring fire extinguishers and attack fire.
2-3.....	Crew retreat toward fresh air.

## EVENTS FOR CONTEST.

Select for the rescue operations such conditions as follow a mine explosion, as noted below:

1. Miner overcome and lying unconscious in a room to be rescued and revived.

2. A mine fire in the main entry to be extinguished or sealed off.

3. A miner imprisoned by a fall of roof—remove fall, rescue and revive miner.

4. Fall of roof injures one of rescue crew—remove him to fresh air and give treatment.

5. Loose and dangerous roof—place timbers to make it secure.

6. Two men found barricaded in fresh air—remove them through the noxious gases and take to fresh air, give treatment for burns, shock, thirst, and hunger.

## SUGGESTED RULES FOR CONDUCTING CONTEST.

For conducting contests with rescue apparatus, the following rules are suggested:

1. Each crew shall consist of five men, one of whom shall be the captain. Each man shall be provided with a breathing apparatus, safety and electric lamp, and each crew shall carry a canary bird in a cage to the base of operations.

2. The captain shall command his men by signals given by a gong or horn, after the men have put on the apparatus and turned on the oxygen.

3. Before putting on the apparatus the pulse and respiration of each man shall be taken by a surgeon. The apparatus shall be placed at a point convenient to each man, and upon command of the captain each man shall first examine his apparatus, make such tests as will convince him that the apparatus is in proper working order, and put it on without assistance.

4. The captain shall inspect each apparatus, noting the number of each apparatus worn and the reading of the oxygen pressure gage. Rescuer No. 1 shall inspect the apparatus worn by the captain.

5. The team, with its captain, the latter wearing apparatus, shall appear before the judges, who shall be men trained and experienced in the use of breathing apparatus and lamps. The judges shall make rigid inspection of each apparatus and discount for any improper connection or adjustment of the apparatus, lamp, or accouterment.

6. Each crew shall then be required to walk 117 yards at the rate of 4 miles an hour (352 feet or 117 yards in a minute), then immediately enter an air-tight smoke room containing strong formaldehyde fumes and remain 10 minutes. As the men come out of the smoke room their condition shall be ascertained by a surgeon to determine the pulse and respiration of each man; and if the pulse or respiration of any man is abnormal, he shall be dropped from the crew and the crew shall be penalized by a discount. (The weakness of a member of a crew would, of course, prevent the crew from participating in the subsequent rescue work unless a substitute should be added who successfully underwent the same test.)

7. If during the recovery work consecutive members of a crew become separated beyond an interval of 2 yards, a penalty will be applied.

8. Failure to stop at intervals of 300 feet for periods of one minute for resting will be penalized.

9. For not having a full charge of oxygen and a fresh charge of chemical at the time the apparatus is first put on a penalty will be applied. The committee may arbitrarily designate a supply of oxygen sufficient for one hour as a full charge.

10. For failure on the part of any member to comply with the com-

11. A fire boss will be stationed at the entrance to the mine who will examine the safety lamps carried by the rescue crew.

12. A recorder designated by the judges will check each member of the crews as he goes in and comes out of the mine, taking his name and giving him a check as he enters and replacing on the board the check as he comes out.

PENALTIES AND DISCOUNTS FOR CONTEST.

To give a definite idea of the discounts generally assigned as penalties in mine-rescue contests, a specimen tally sheet is shown below:

*Specimen tally sheet for mine-rescue contest.*

Name and number of event.....					
No.	Cause of penalty.	Points discounted.	Team No. ....	Team No. ....	Team No. ....
1	Apparatus not having a full charge of oxygen.....	5			
2	Apparatus not properly assembled.....	10			
3	Failure to test apparatus before putting on.....	10			
4	Failure to make record of tests.....	5			
5	Failure of captain to command properly.....	5			
6	Failure of any member to obey command.....	10			
7	Failure to maintain proper interval in marching.....	5			
8	Failure to rest for one minute at stated intervals.....	5			
9	Failure of a member to pass doctor's examination.....	5			
10	Failure of apparatus to deliver oxygen in quantity equivalent to the time in actual service.....	10			
11	Failure of lamps to burn or be in proper and safe condition.....	10			
	Total.....	80			

DETAILS OF CONDUCTING A FIRST-AID CONTEST.

The teams for a first-aid contest should be well organized and drilled in first-aid treatment and handling the patient. Such instruction may be obtained by miners and officials free of cost by application to the Bureau of Mines, which maintains a force of miners and a surgeon who have been especially trained in first-aid methods. The training may be given by local physicians or surgeons who have become familiar with first-aid treatment.

The organization of first-aid teams at a mine requires the cooperation of the officials of the mine and the miners; the officials to provide quarters and first-aid materials and the miners to volunteer their services.

The mine foreman or underground manager should lend his efforts in the selection of at least 10 active, young miners, who are of a sympathetic nature, and prevail upon them to undergo a course of instruction in first aid.

After the course has been completed the men should be divided into teams of five each. These teams should then select one of their number to act as captain. Each team should have weekly or semi-

monthly meetings and give demonstrations for the benefit of other miners, who should be urged to become members of additional teams. Each member of the original teams should become an instructor, and the local physician should be requested to be present and prompt the men in their work.

After a number of teams have been instructed a contest should be arranged between the several teams to determine the relative efficiency of each team. The winning team should be rewarded by the presentation of a banner or badge indicating that its members belong to the senior team. To individual members of the team should be presented a neatly designed first-aid button or pin. At intervals of six months similar contests should be conducted to afford other teams the opportunity of competing for the senior badge or banner.

The captains should control their teams by giving commands in a clear, distinct voice, sufficiently loud to be heard by spectators; in a stretcher drill, especially, care should be taken by the captain to make himself heard by the spectators.

When in the field for exhibition or contest work each member should remain at attention when not engaged in active duty.

#### ARRANGEMENT OF THE GROUNDS.

Contests and demonstrations are usually given in the presence of spectators, and every facility should be provided that will admit of the spectators seeing the treatment given, and the events should be disposed of in such manner that time is not lost or wasted, to the annoyance of the spectators and the teams.

The team and patient should be drawn up in a line and upon signal the patient should take his place at a point 15 feet in front of the team, usually with his feet toward the spectators.

In dressing a wound or injury the work should be performed in such manner as to permit the spectators to see the treatment.

#### EVENTS FOR THE CONTEST.

Select for first-aid treatment such injuries as are of common occurrence within mines, such as cuts and lacerations, simple fractures, compound fractures, burns, suffocation by gases, electric shock, dislocations, mangled members.

#### RULES GOVERNING FIRST-AID CONTEST.

A set of rules to govern a first-aid contest is presented below:

1. A team shall be composed of five men and a captain. Any employee of a coal company may be a member of a contesting team, provided he is not a physician or trained nurse.
2. The captain shall select the patient and designate the member or members of the team to perform the event.



3. The captain shall control his team in their field work by giving audible commands.

4. The captain may select himself as one of the members who will perform the event.

5. The captain or other members shall not prompt the person performing the event unless he be one of the performers. This rule will not apply in full-team events.

6. At the conclusion of any event the captain shall raise his right hand and announce his team number. The team shall remain at its post until relieved by the judge.

7. Teams shall bring their own first-aid materials, including bandages, splints, blankets, etc., and shall not be allowed to leave the patient in order to obtain material.

8. The triangular bandage shall be the standard used in the contest, but roller bandages may be used, and equal credit will be given for their proper use.

9. All splints must be prepared on the field for each event requiring their use. Specially designed splints may be used, but they must be assembled during the time of each event requiring their use.

10. No practicing shall be allowed on the field before the beginning of the contest.

11. The teams will be numbered consecutively, beginning at No. 1, and they shall occupy their consecutive positions on the field.

12. The judges will perform their work progressively,<sup>a</sup> judging such number of teams in each event as the judges may determine and announce before the beginning of the contest.

13. In events involving resuscitation, the rescue of the patient, and stretcher drill the judge may require the teams to perform separately.

14. Each judge will mark the team number, event, and discounts for each team judged, sign his name, and deliver to the recorder his record.

15. The recorders will add the discounts and mark the points made by each team in each event. The total points will be divided by the number of events and the quotient will be the average for each team for the whole contest.

16. Time will not be an element unless the team or men performing exceed the allotted time or fail to give treatment promptly. All events shall commence and be finished at the sounding of a gong, or other audible signal.

17. All proposed exceptions to these rules must be made to the committee on rules not later than 10 days prior to the day of the contest. The decision of the committee will be final.

18. The prizes will be listed by the committee on awards.

<sup>a</sup> Each judge will be assigned to judge two or three teams for one event; for the following event he will judge two or three teams, and so on, until he has finished for each event, he will proceed to another set of teams.

# 10 RULES FOR MINE-RESCUE AND FIRST-AID FIELD CONTESTS.

## PENALTIES AND DISCOUNTS FOR FIRST-AID CONTEST.

A specimen tally sheet showing penalties imposed in first-aid contests is given below:

*Specimen tally sheet for first-aid contest.*

Name and number of event.....					
No.	Cause of penalty.....	Points discounted.....	Team No.....	Team No.....	Team No.....
1	Not doing the most important thing first.....	5			
2	Failure of captain to command properly.....	2			
3	Slowness in work and lack of attention.....	4			
4	Failure to entirely cover the wound or ignorance of location of injury.....	4			
5	Ineffective artificial respiration.....	10			
6	Splints improperly padded or applied.....	2			
7	Tight, loose, or improperly applied bandages.....	6			
8	Insecure or "granny" knot.....	5			
9	Unclean first-aid material.....	5			
10	Failure to have on hand sufficient and proper material to complete a dressing.....	5			
11	Lack of neatness.....	2			
12	Awkward handling of patient on stretcher.....	5			
13	Assistance lent by patient.....	5			
14	Tourniquet improperly applied.....	5			
15	Failure to stop bleeding.....	5			
16	Not treating shock.....	5			
17	Failure to be aseptic.....	10			
18	Incorrect treatment.....	10			
19	Not named above.....	5			
	Total.....	95			

\* Cause to be inserted.

## PUBLICATIONS ON MINE ACCIDENTS AND METHODS OF MINING.

Limited editions of the following Bureau of Mines publications are available for free distribution. Requests for all publications can not be granted. Requests should be addressed to the Director, Bureau of Mines, Washington, D. C.:

BULLETIN 10. The use of permissible explosives, by J. J. Rutledge and Clarence Hall. 1912. 34 pp., 5 pls., 4 figs.

BULLETIN 15. Investigations of explosives used in coal mines, by Clarence Hall, W. O. Spelling, and S. P. Howell, with a chapter on the natural gas used at Pittsburgh, by G. A. Burrell, and an introduction by C. E. Munroe. 1911. 197 pp., 7 pls., 5 figs.

BULLETIN 17. A primer on explosives for coal miners, by C. E. Munroe and Clarence Hall. 61 pp., 10 pls., 12 figs. Reprint of United States Geological Survey Bulletin 423.

BULLETIN 20. The explosibility of coal dust, by G. S. Rice, with chapters by J. C. W. Frazer, Axel Larsen, Frank Haas, and Carl Scholz. 204 pp., 14 pls., 28 figs. Reprint of United States Geological Survey Bulletin 425.

BULLETIN 42. The sampling and examination of mine gases and natural gas, by G. A. Burrell and F. M. Seibert. 1913. 116 pp., 2 pls., 23 figs.

BULLETIN 45. Sand available for filling mine workings in the Northern Anthracite Coal Basin of Pennsylvania, by N. H. Darton. 1913. 33 pp., 8 pls., 5 figs.

BULLETIN 46. An investigation of explosion-proof mine motors, by H. H. Clark. 1912. 41 pp., 6 pls., 14 figs.

BULLETIN 50. A laboratory study of the inflammability of coal dust, by J. C. W. Frazer, E. J. Hoffman, and L. A. Scholl, jr. 1913. 60 pp., 95 figs.

BULLETIN 52. Ignition of mine gases by the filaments of incandescent electric lamps, by H. H. Clark and L. C. Hsley. 1913. 31 pp., 6 pls., 2 figs.

BULLETIN 53. Mining and treatment of feldspar and kaolin in the Southern Appalachian region, by A. S. Watts. 1913. 171 pp., 16 pls., 12 figs.

BULLETIN 56. First series of coal-dust explosion tests in the experimental mine, by G. S. Rice, L. M. Jones, J. K. Clement, and W. L. Egly. 1913. 115 pp., 12 pls., 28 figs.

BULLETIN 59. Investigations of detonators and electric detonators, by Clarence Hall and S. P. Howell. 1913. 73 pp., 7 pls., 5 figs.

BULLETIN 60. Hydraulic mine filling; its use in the Pennsylvania anthracite fields; a preliminary report, by Charles Euzian. 1913. 77 pp., 3 pls., 12 figs.

TECHNICAL PAPER 6. The rate of burning of fuse as influenced by temperature and pressure, by W. O. Snelling and W. C. Cope. 1912. 28 pp.

TECHNICAL PAPER 7. Investigation of fuse and miners' spades, by Clarence Hall and S. P. Howell. 1912. 19 pp.

TECHNICAL PAPER 11. The use of mice and birds for detecting carbon monoxide after mine fires and explosions, by G. A. Burrell. 1912. 15 pp.

TECHNICAL PAPER 13. Gas analysis as an aid in fighting mine fires, by G. A. Burrell and F. M. Seibert. 1912. 16 pp., 1 fig.

TECHNICAL PAPER 14. Apparatus for gas analysis laboratories at coal mines, by G. A. Burrell and F. M. Seibert. 1913. 24 pp., 7 figs.

TECHNICAL PAPER 17. The effect of stemming on the efficiency of explosives, by W. O. Snelling and Clarence Hall. 1912. 20 pp., 11 figs.

TECHNICAL PAPER 18. Magazines and thaw houses for explosives, by Clarence Hall and S. P. Howell. 1912. 34 pp., 1 pl., 5 figs.

TECHNICAL PAPER 19. The factor of safety in mine electrical installations, by H. H. Clark. 1912. 14 pp.

TECHNICAL PAPER 21. The prevention of mine explosions; report and recommendations, by Victor Wattenae, Carl Meissner, and Arthur Desborough. 12 pp. Reprint of United States Geological Survey Bulletin 369.

TECHNICAL PAPER 22. Electrical symbols for mine maps, by H. H. Clark. 1912. 11 pp., 8 figs.

TECHNICAL PAPER 23. Ignition of mine gas by miniature electric lamps with tungsten filaments, by H. H. Clark. 1912. 15 pp.

TECHNICAL PAPER 24. Mine fires, a preliminary study, by G. S. Rice. 1912. 51 pp., 1 fig.

TECHNICAL PAPER 28. Ignition of mine gas by standard incandescent lamps, by H. H. Clark. 1912. 6 pp.

TECHNICAL PAPER 29. Training with mine-rescue breathing apparatus, by J. W. Paul. 1912. 16 pp.

TECHNICAL PAPER 30. Mine-accident prevention at Lake Superior iron mines, by D. E. Woodbridge. 1913. 38 pp., 9 figs.

TECHNICAL PAPER 33. Sanitation at mining villages in the Birmingham district, Ala., by D. E. Woodbridge. 1913. 27 pp., 1 pl., 9 figs.

TECHNICAL PAPER 40. Metal-mine accidents in the United States during the calendar year 1911, compiled by A. H. Fay. 1913. 51 pp.

TECHNICAL PAPER 41. Safety electric switches for mines, by H. H. Clark. 1913. 8 pp.

TECHNICAL PAPER 46. Quarry accidents in the United States during the calendar year 1911, compiled by A. H. Fay. 1913. 32 pp.

TECHNICAL PAPER 47. Portable electric mine lamps, by H. H. Clark. 1913. 13 pp.

TECHNICAL PAPER 48. Coal-mine accidents in the United States, 1896-1912, with monthly statistics for 1912, compiled by F. W. Horton. 1913. 74 pp., 10 figs.

## 12 RULES FOR MINE-RESCUE AND FIRST-AID FIELD CONTESTS.

TECHNICAL PAPER 52. Permissible explosives tested prior to March 1, 1913, by Clarence Hall. 1913. 11 pp.

TECHNICAL PAPER 56. Notes on the prevention of gas or dust explosions in coal mines, by G. S. Rice. 1913. 21 pp.

TECHNICAL PAPER 61. Metal-mine accidents in the United States during the calendar year 1912, compiled by A. H. Fay. 1913. 76 pp., 1 fig.

MINERS' CIRCULAR 3. Coal-dust explosions, by G. S. Rice. 1911. 22 pp.

MINERS' CIRCULAR 5. Electrical accidents in mines; their causes and prevention, by H. H. Clark, W. D. Roberts, L. C. Hsley, and H. F. Randolph. 1911. 10 pp., 3 pls.

MINERS' CIRCULAR 7. The use and misuse of explosives in coal mining, by J. J. Rutledge, with a preface by J. A. Holmes. 1913. 52 pp., 8 figs.

MINERS' CIRCULAR 8. First-aid instructions for miners, by M. W. Glasgow, W. A. Raudenbush, and C. O. Roberts. 1913. 67 pp., 51 figs.

MINERS' CIRCULAR 9. Accidents from falls of roof and coal, by G. S. Rice. 1912. 16 pp.

MINERS' CIRCULAR 10. Mine fires and how to fight them, by J. W. Paul. 1912. 14 pp.

MINERS' CIRCULAR 11. Accidents from mine cars and locomotives, by L. M. Jones. 1912. 16 pp.

MINERS' CIRCULAR 12. The use and care of miners' safety lamps, by J. W. Paul. 1913. 16 pp., 4 figs.

MINERS' CIRCULAR 13. Safety in tunneling, by D. W. Brunton and J. A. Davis. 1913. 19 pp.

MINERS' CIRCULAR 14. Gases found in coal mines, by G. A. Burrell and F. M. Seibert. 1914. 23 pp.