



DIRECTIONAL LIFELINES

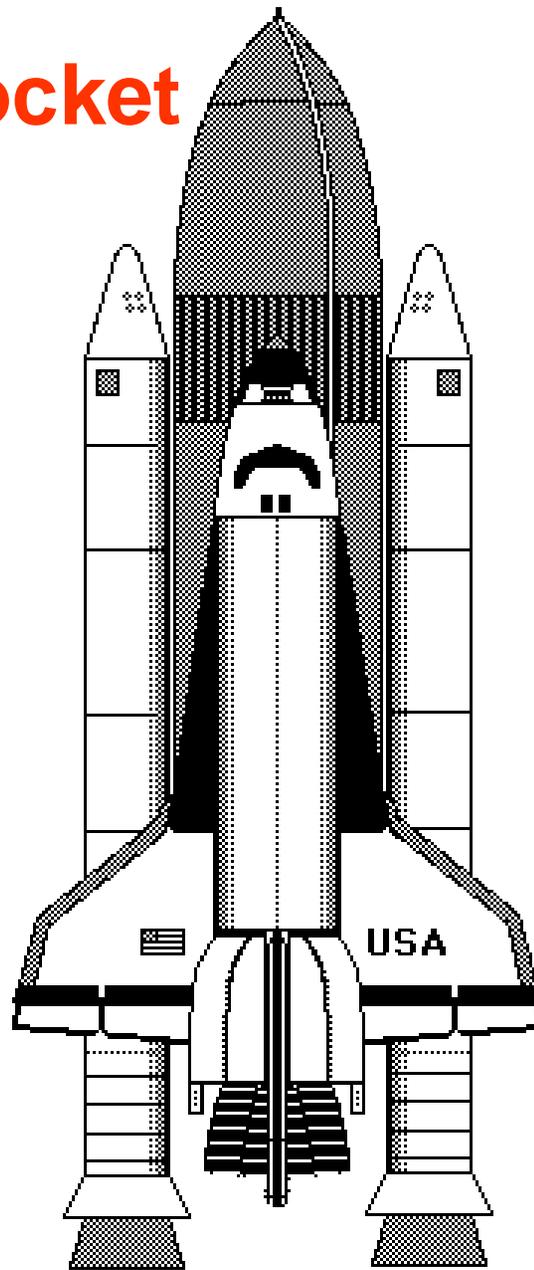
Kenneth A. Sproul

MSHA Approval & Certification Center

**Mine Escape Planning and Emergency Shelters Workshop
April 18, 2006**

It's not Rocket Science!

NASA'S
SPACE SHUTTLE

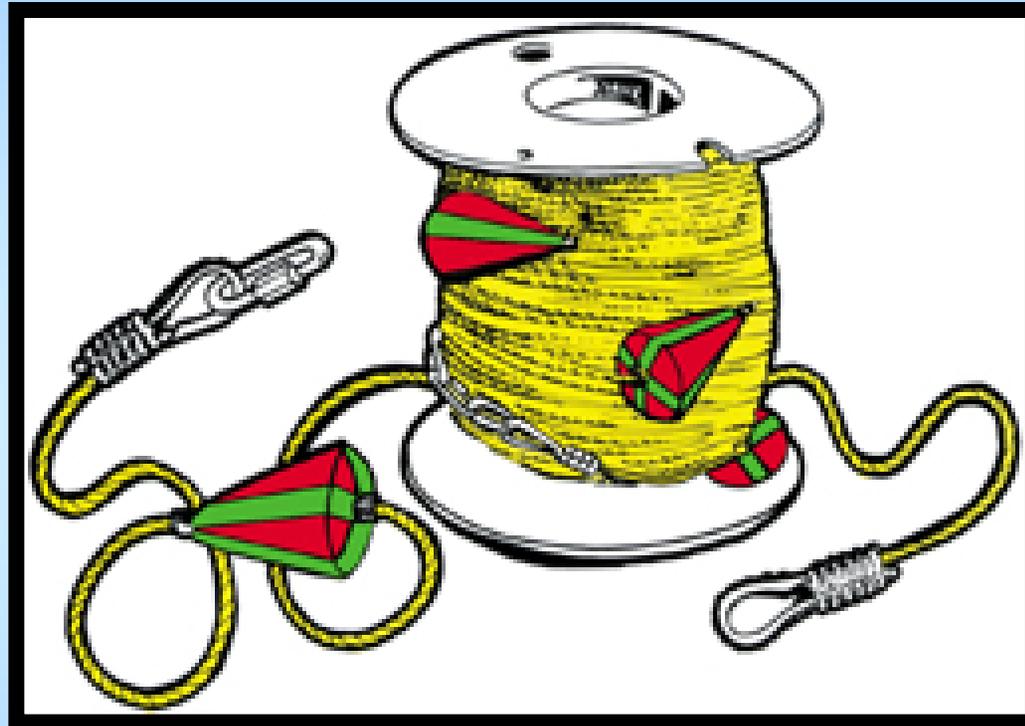


$$(NH) \quad y'' + p(x)y' + q(x)y = g(x).$$

$$\frac{d^2 y}{dx^2} = f(x, y, y')$$

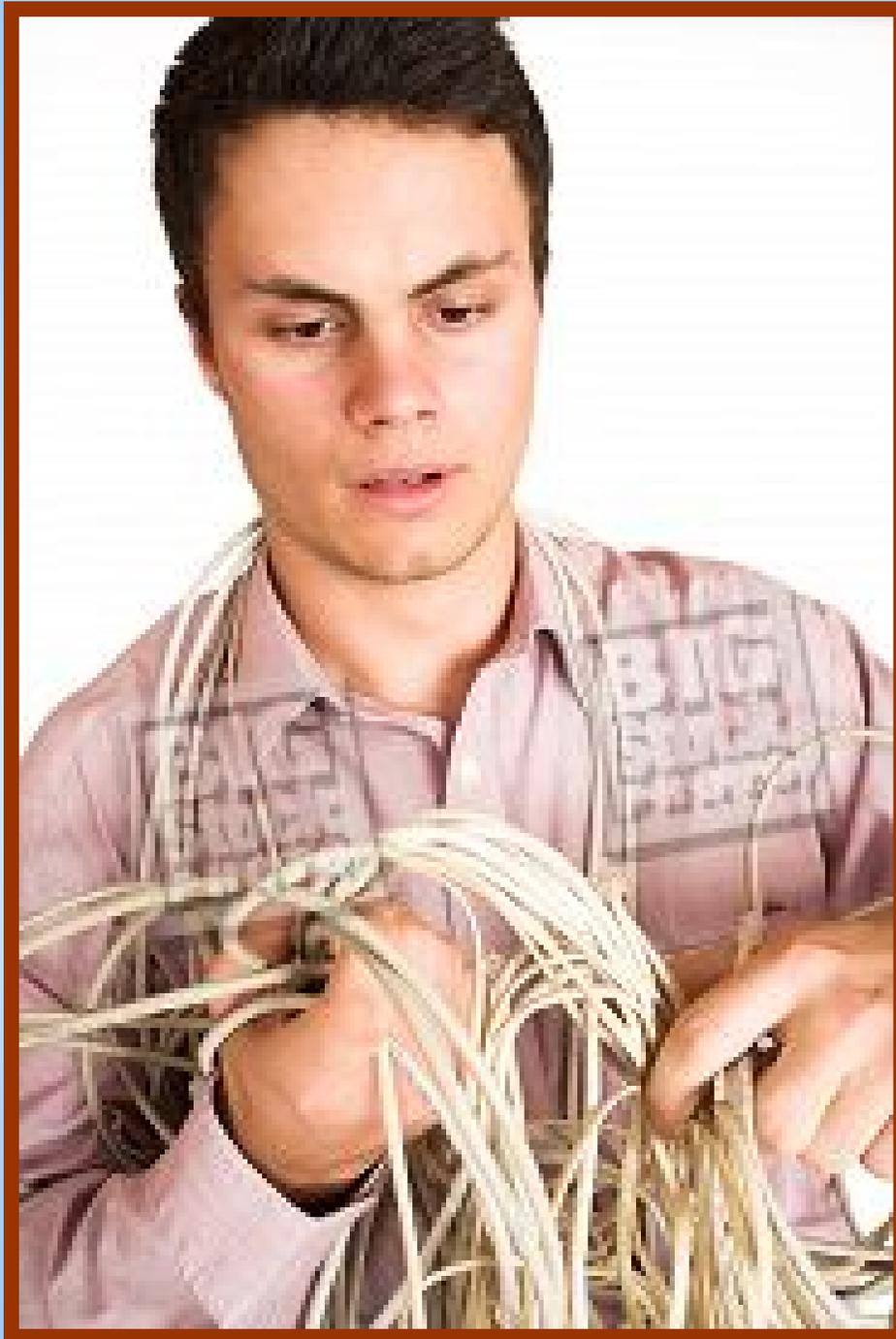
$$\begin{aligned} \text{area} &= \frac{1}{2} \int_a^b (x[t] y'[t] - y[t] x'[t]) dt \\ &= \frac{1}{2} \sum_{i=1}^n (0.5(x_{i+1} + x_i) (y_{i+1} - y_i) - 0.5(y_{i+1} + y_i) (x_{i+1} - x_i)) \end{aligned}$$

It's A Rope...



...but it just might save lives!





State Requirements

- West Virginia - Lifelines required in alternate escapeways ventilated by return air.
- Kentucky - Lifelines required in alternate escapeways ventilated by return air.
- Virginia - Lifelines required in all primary escapeways

U.S. Department of Labor

MSHA

Mine Safety and Health Administration

“Safety Standards for the Use of Belt Entry As an Intake Air Course to Ventilate Working Sections and Areas Where Mechanized Mining Equipment is Being Installed or Removed”

- Effective Date June 1, 2004

Installation of lifelines is required only in return air courses designated as an alternate escapeway, or portions of the return used as part of the alternate escapeway.

Emergency Temporary Standard; Notice of public hearings; Notice of close of comment period. The Mine Safety and Health Administration has issued an emergency temporary standard under section 101(b) of the Federal Mine Safety and Health Act of 1977 in response to the grave danger which miners are exposed to during underground coal mine accidents and subsequent evacuations.



Federal Register

Thursday,
March 9, 2006

March 9, 2006

Part III

Department of Labor

Mine Safety and Health Administration

30 CFR Parts 48, 50, and 75

Emergency Mine Evacuation; Final Rule

§ 75.380 Escapeways; bituminous and lignite mines.

*** * * * ***

(d) Each escapeway shall be -

(7) Provided with a continuous directional lifeline or equivalent device that shall be:

- (i) Installed and maintained throughout the entire length of each escapeway as defined in paragraph (b)(1) of this section.**
- (ii) Made of durable material.**
- (iii) Marked with a reflective material every 25 feet.**
- (iv) Located in such a manner for miners to use effectively to escape.**
- (v) Equipped with directional indicators, signifying the route of escape, placed at intervals not exceeding 100 feet.**
- (vi) Securely attached to and marked to show the location of any SCSR storage locations in the escapeway**

(d) Each escapeway shall be -

**Includes both the primary (intake)
and alternate escapeway**

(7) Provided with a continuous directional lifeline or equivalent device that shall be:

A directional lifeline is most likely a rope made of durable material, though it could also be an equivalent device, such as a pipe or handrail

(i) Installed and maintained throughout the entire length of each escapeway as defined in paragraph (b)(1) of this section.

Escapeways shall be provided from each working section, and each area where mechanized mining equipment is being installed or removed, continuous to the surface escape drift opening or continuous to the escape shaft or slope facilities to the surface.

(ii) Made of **durable material.**

Lifelines must be constructed of durable (strong) materials and must survive normal mining conditions (e.g., atmospheric conditions such as humidity). They must be available in an emergency when miners need them to evacuate the mine. In addition, lifelines must also be sturdy enough to withstand intense physical use during an evacuation.

(iii) Marked with a reflective material every 25 feet.

... so that miners can locate the lifeline using their cap lamps in low-visibility conditions and when smoke is present.

(iv) Located in such a manner for miners to use **effectively to escape.**

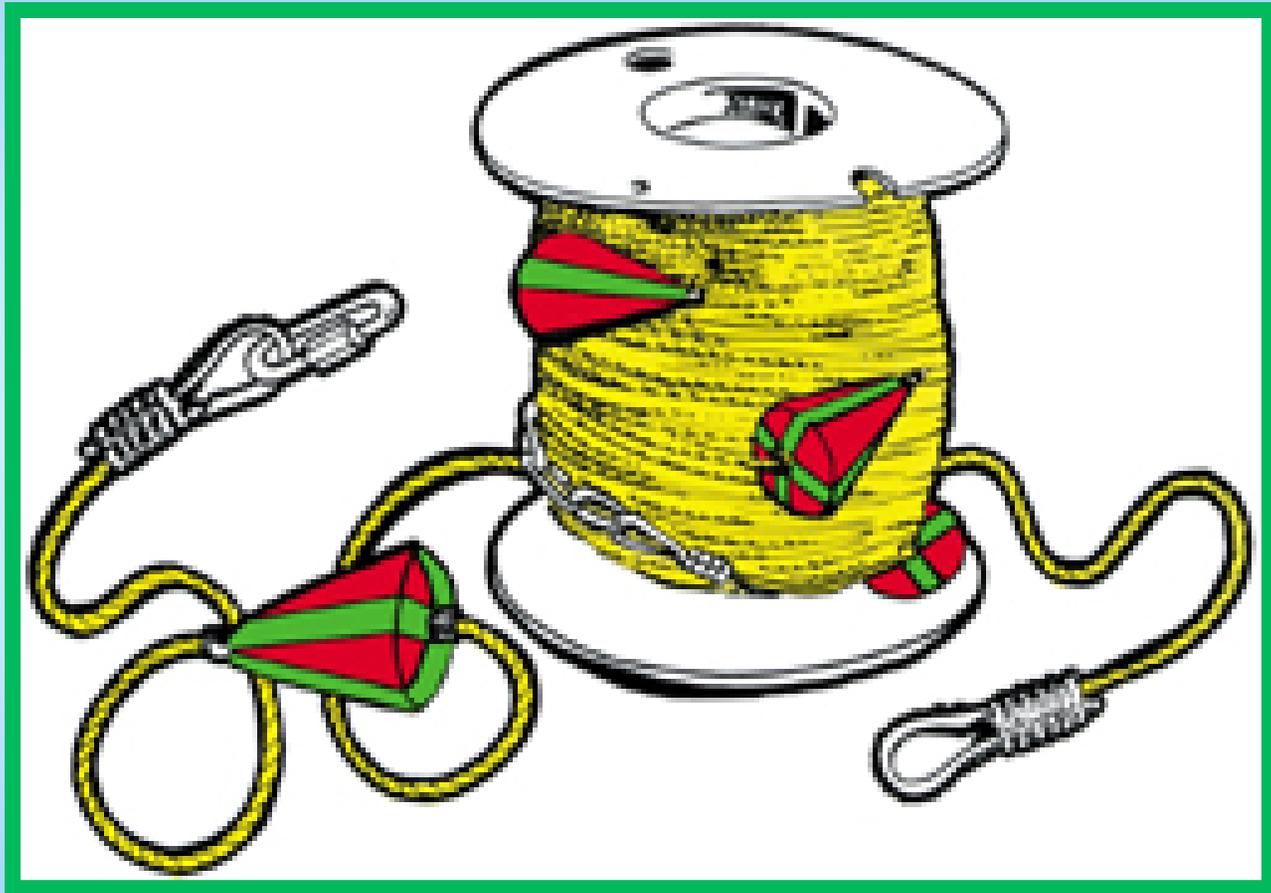
The proper positioning of the lifeline regarding height, accessibility, and location as determined by the mining conditions improves the ability of miners to effectively use lifelines to escape during emergency situations.

(v) Equipped with **directional indicators, signifying the route of escape, placed at intervals not exceeding **100 feet**.**

These directional indicators are physical objects, such as, but not limited to, cones, that provide tactile feedback to a miner attempting to escape a dark, smoke-filled environment.

(vi) Securely attached to and marked to show the location of any SCSR storage locations in the escapeway

Miners escaping a mine under adverse environmental conditions may need to access additional SCSRs in order to successfully evacuate the mine

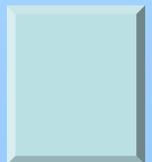






DIRECTION OF TRAVEL OUTBY

Figure 14

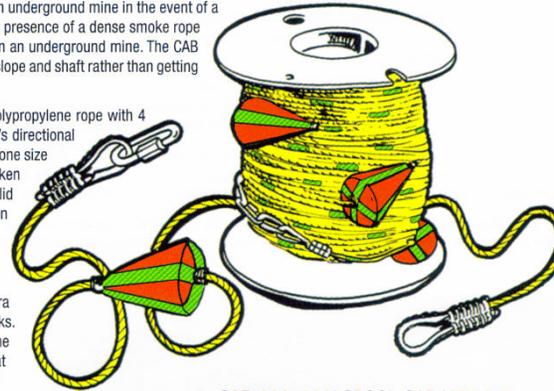


CAB LIFELINE

The CAB lifeline is an emergency escape rope designed to help evacuate an underground mine in the event of a fire or explosion. Research by the U.S. Bureau of Mines has shown that the presence of a dense smoke rope can improve the chances for a successful escape when a fire breaks out in an underground mine. The CAB LIFELINE, with its sturdy directional cones, will help lead employees to the slope and shaft rather than getting lost or confused in an actual emergency.

Each standard spool of LIFELINE contains 300' or 1000' of 1/4" yellow polypropylene rope with 4 orange directional indicators installed at 25, 75 or 100 foot intervals. CAB's directional indicators are molded in a solid cone for extra strength and durability. The cone size and shape is specifically designed to prevent a hand grip from being broken when in actual use. All cones are firmly attached to the LIFELINE with solid corrosion resistant stop sleeves. For added safety, reflective tape is applied on all cones and on the rope at 25 ft. intervals. This provides faster identification of the Lifeline and indicates the proper direction of travel for escape from the mine.

CAB LIFELINE sections are quickly and securely locked together with extra heavy duty rated oval sleeves, galvanized thimbles and galvanized quick links. A wide variety of CAB hangers can be used to install the LIFELINE from the side wall or roof of the mine. CAB rope hangers can suspend the LIFELINE at any height desirable in mines with higher roof conditions (see page 7). Other colors of cones and reflective strips are also available. For more information or samples, contact CAB or your CAB distributor.



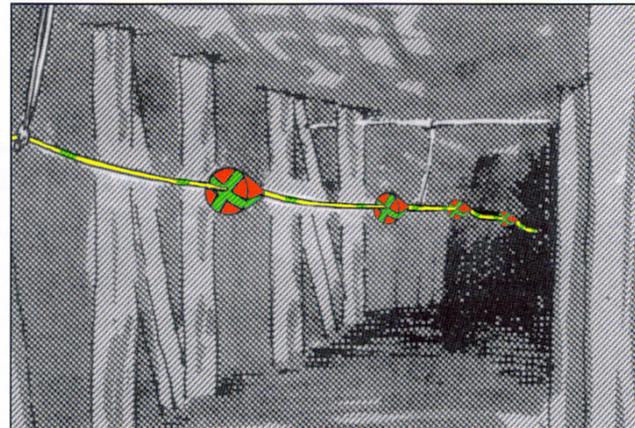
**CAB 920 300' SPOOL CAB LIFELINE
REFLECTORIZED CONES EVERY 75'.
REFLECTIVE TAPE EVERY 25'.**



CAB LIFELINE

CAB#	SPOOL LENGTH	CONE SPACING	BOX WT. (2 spools/Box)
938	300'	25'	.20 lbs.
920	300'	75'	.12 lbs.
946	300'	100'	.12 lbs.
942	1000'	100'	.33 lbs.

- For higher visibility and to meet new MSHA regulations, all CAB Lifeline is marked with reflective tape at 25 ft. intervals.
- All styles of Lifeline are available with the moveable cones that can field positioned in any location on the lifeline.
- Additional cones can be added to any style of Lifeline.



CAB's directional indicators are molded in a solid cone for the highest level of strength, safety and durability. They can't be accidentally dislodged or removed from the lifeline.



SMM ROPES

By B. S. C.

WWW.ROPEHANGERS.COM



- * **Rope - 900 Lb Tensile**
Flame Resistant & Non-Conductive
- * **Cones - Self-Locking, Fluorescent,**
Flame Resistant, & Non-Conductive
- * **Connectors -**
Non-Spark Bronze 'O' Ring
Non-Spark Bronze Snaphook



PATENT
5,988,101

SAFETY
DIRECTIONAL
LINE

SMM SDL30075

MADE IN U. S. A.





CAB PRODUCTS ARE MANUFACTURED BY:

[The Cambria County Association for the Blind and Handicapped](#)

175 Industrial Park Road, Ebensburg, PA 15931-4109 U.S.A.

TEL: 814-472-5077 FAX: 814-472-7179

email: cab@cabproducts.com



BOONE SUPPLY

**P. O. Box 429, 100 Coal River Drive,
Sylvester, WV 25193, U. S. A.**

Tel: 1-888-440-2811 / 1-304-854-0761

Fax: 1-304-854-1320

**E-Mail: sales@ropehangers.com or
boonesupply@citynet.net**



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**Have you
reached
the end of
your rope
yet?**



The End

CAB LIFELINE INSTALLATION INSTRUCTIONS

MSHA REGULATION 75.380 – ESCAPEWAYS

THE FOLLOWING FIGURE SHOWS HOW MINERS USE DIRECTIONAL CONES FOR INDICATING PROPER DIRECTION FOR EVACUATION. AS A MINER SLIDES HIS HAND ALONG THE LIFELINE, HE WILL ENCOUNTER THE CONES. IF THE PROPER DIRECTION IS BEING FOLLOWED, THE HANDS WILL SLIDE OVER THE CONE. IF THE DIRECTION IS NOT CORRECT, THE MINER WILL EXPERIENCE THE FLAT END OF THE CONE, AND WILL NEED TO REVERSE DIRECTION.

