



AGENCIA NACIONAL DE  
**MINERÍA**  
NATIONAL MINING AGENCY

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to everybody  
Ministry of Mines



El futuro  
es de todos

Minminas

# BEHAVIOR-BASED SAFETY FOR THE ACCIDENT PREVENTION AMONGST RESCUERS IN MINING EMERGENCY CARE



# Why do accidents happen to rescuers in emergency care?



**Accidents  
occur due to:**



**Unsafe  
Acts**

**Unsafe  
Conditions**

## What is behavior- based safety (SBC)?

Process that focuses on strengthening safe behaviors and reduce or eliminate those that cause risks, to reduce occupational accidents and diseases.



## What should a rescuer have?

SELF -  
CONFIDENCE

SELF -  
ESTEEM

SELF -  
CONTROL



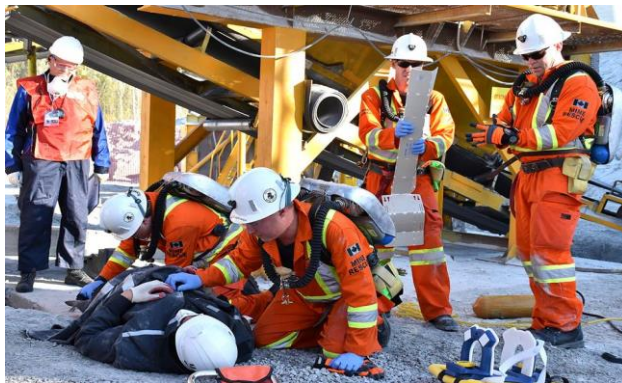
Fuente: ANM Colombia

OPTIMISM

SENSE OF  
BELONGING

EMPOWERMENT

The rescuer (emergency response professional) is a complex professional, who must maintain a constant readiness through time, showing skills according to training standards.



An emergency is a situation that appears when there is an eventual, unexpected and unpleasant phenomenon or event, because of its power to cause damage or alterations in people, goods, services or to the environment.

“An emergency professional who denies fear, is convinced to such a point that he / she represents an important risk factor to work in emergencies. This feature usually induces other risks and we could be exposed to freelancing in emergencies”.

Source: xxxxxxxxxx



Un profesional de la emergencia que niega el miedo se convence al tal punto que representa un factor de riesgo importante al trabajo en emergencias. Este rasgo generalmente induce a otros riesgos y podríamos estar expuestos al freelancing en las emergencias.



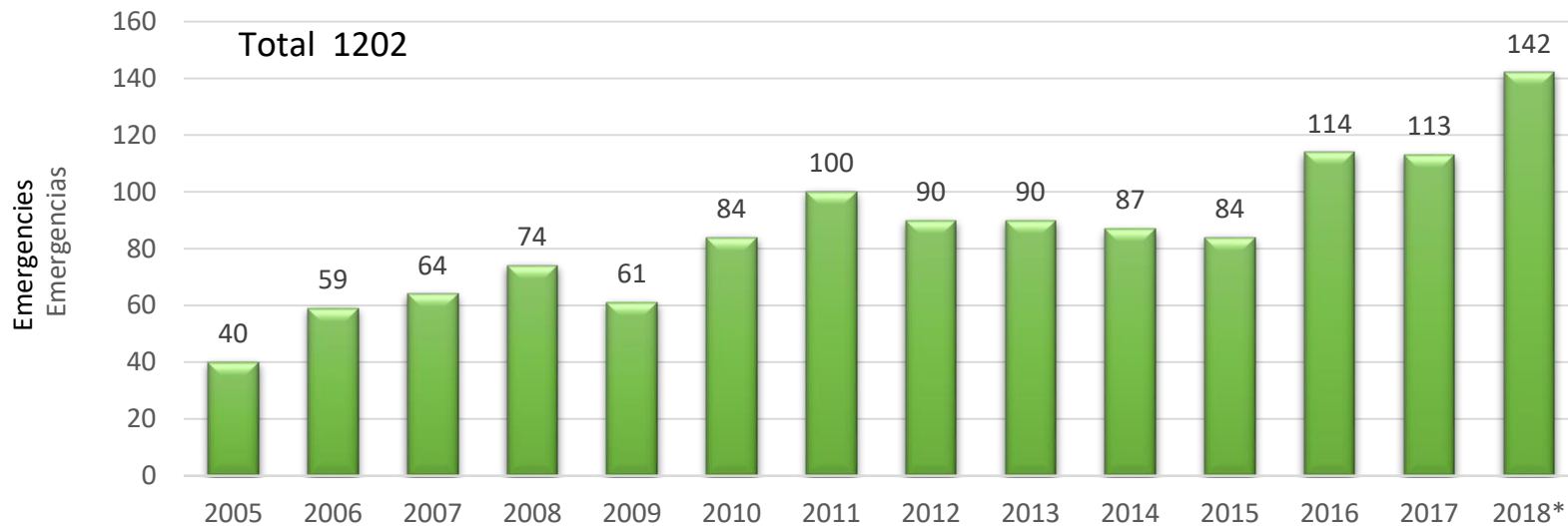
From the year 2015 until the year 2018 Colombian Rescuers have had to respond to an increase of **60 %** in relation to the number of mining emergencies that are served. This has forced the government to raise its competence standards in terms of training and response, providing first – line knowledge.



Source: ANM Colombia

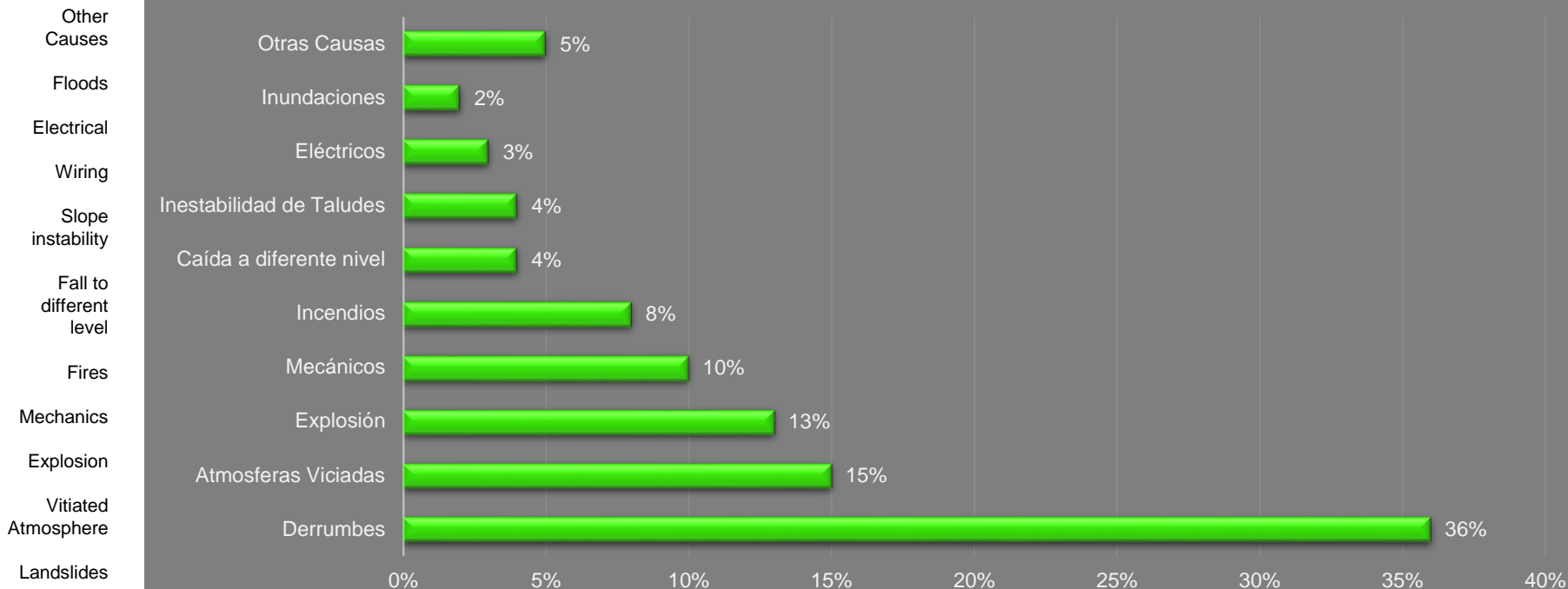
*As an opportunity for improvement, accident statistics of rescuers in the care of mining emergencies should be kept, in order to perform cause analysis to identify the different behaviors.*

## MINING EMERGENCIES OCCURRED BETWEEN THE YEARS 2005 - 2018\*





## Causes of mining emergencies in Colombia between 2005 and 2018



	Derrumbes	Atmosferas Viciadas	Explosión	Mecánicos	Incendios	Caída a diferente nivel	Inestabilidad de Taludes	Eléctricos	Inundaciones	Otras Causas
■ Causas	36%	15%	13%	10%	8%	4%	4%	3%	2%	5%

	Landslides	Vitiated atmospheres	Explosion	Mechanics	Fires	Fall to different level	Slope instability	Electrical Wiring	Floods	Other Causes
<b>Causes</b>	36 %	15 %	13 %	10 %	8 %	4 %	4 %	3 %	2 %	5 %



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## Rescuers' psychological, physiological, behavioral and cognitive state in a mining emergency

*This activation allows them to concentrate, make decisions quickly and develop a great activity in order to respond rapidly to the varied demands that occur, but it also poses a significant wear on the body; and the situations and images of human suffering that contextualize their work may end up affecting them.*



## AT THE PHYSIOLOGICAL LEVEL

## AT A COGNITIVE LEVEL

Heart rate, respiration and blood pressure increase

Irrational and / or negative thoughts and assessments

Palpitations, sweating, sudden heat

Disorganization in the information analysis

Continuous need to urinate or urinate a lot, diarrhea bouts

Difficulties in decision - making, and concentration in general

Nausea or vomiting

Inadequate attention focus

Trembling in hands and feet, hyperventilation, and sense of panic

Forgot important issues

Physiological stupor

Sensation of lack of self - confidence and lack of control



## On a psychological level

Wrath

Emotional Shock

Guilt

Dullness

Sadness

Denial

Defenselessness

Fear

Anxiety

Stress



Source: ANM Colombia



Dilated pole:  
hyperactive,  
nervous,  
precipitated,  
agitated,  
chaotic,  
gesturing,  
uncontrolled.

At the  
behavioral  
level

Constrictive  
pole: hypo -  
active,  
blocked,  
apathetic,  
passive, slow,  
motionless.



## Is stress good or bad in a rescuer during the mining emergency care?

According to the traditional definition of stress of psychological type, this may occur when a person reacts (with mediation or without awareness) to his / her environment categorizing it as threatening or unsafe and his / her personal resources are insufficient, compromising his / her well - being (Lazarus & Folkman, 1984 cited in Domínguez et al., 2002).

General Adaptation Syndrome  
(SGA – *Síndrome General de Adaptation* – for its acronym in Spanish)



## Why to implement the SBC scheme in rescue workers?

- ❖ Significant reduction of accidents
- ❖ Proactive approach
- ❖ Active participation
- ❖ Self – care culture
- ❖ Security Observation supplement
- ❖ Leadership and sense of belonging in the emergency care
- ❖ Personal value for safety

## SBC PROGRAM DESIGN

PREVIOUS  
ACTIVITIES

### ACTIVIDADES PREVIAS



SCHEDULED  
ACTIVITIES

### ACTIVIDADES PROGRAMADAS



Are these the expected results? ¿Los resultados son los esperados?

SI YES

Keep the  
action plans

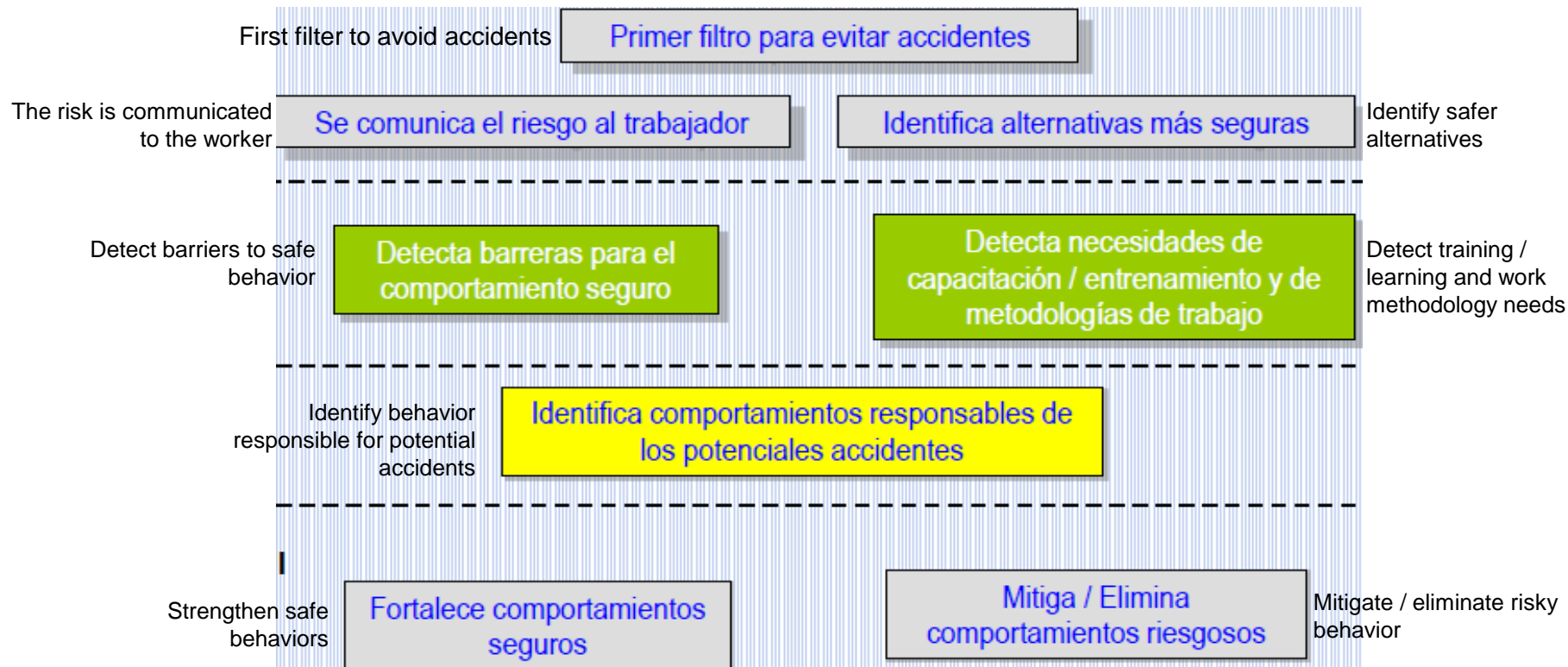
**Se mantienen los  
planes de acción**

NO NO

**Se buscan otros  
planes de acción**

Look for other  
action plans

# BENEFITS



## What behaviors should be eradicated?

Negligence, indifference,  
lack of judgment

Anger, bad mood,  
alcohol, drugs

Bad work  
habits

Distraction



Lack of planning

Excess of  
confidence

Curiosity

Ignorance

Source: ANM Colombia





# What can be done to ensure rescuers “want to work safely in mining emergency care”?



1. Know how to perceive the risk.

2. Motivate toward the choice of safe behaviors.

3. Correct their behavior.

# THANK YOU



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