

Stability Under Pressure Ground Control in Surface Mining

ARMPS

*Analysis of Retreat
Mining Pillar Stability*



*for
Safety!*

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Welcome to the November Issue of Hard Hat Headlines

As the year winds down and the colder, wetter months set in, mining operations face new challenges. This issue places our spotlight on ground control on the surface, an area where seasonal conditions play a major role in safety.

Rain, snow, and freeze-thaw cycles can weaken ground support, create unexpected hazards, and demand extra vigilance from every worker on site. Staying alert, following best practices, and recognizing warning signs are critical in keeping ourselves and our crews safe.

We'll also continue our ongoing coverage of important safety discussions, recent incidents, and lessons learned across the industry. The goal remains the same—sharing knowledge that helps protect miners, improve practices, and strengthen the culture of safety.

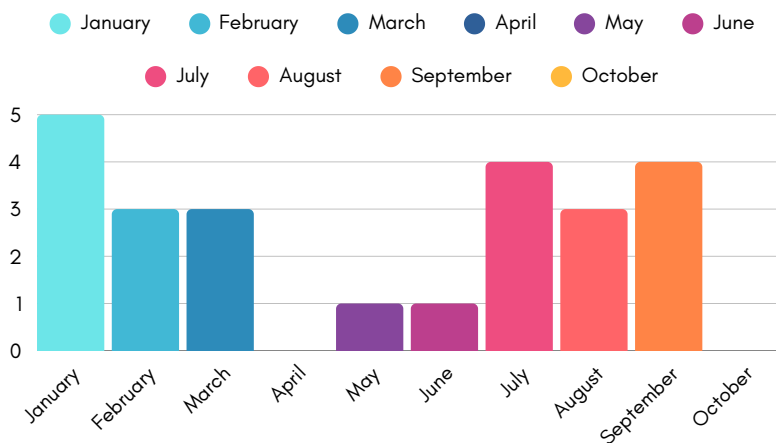


LAST MONTH
Loss



October 2025

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Honoring Those We Lost

We pause to honor the miners whose lives were tragically lost while working to provide for their families and communities.

Each represents more than a statistic—they were fathers, mothers, sons, daughters, friends, and neighbors whose absence leaves an empty place at the table and a heavy weight in the hearts of those who loved them.

Their dedication and sacrifice remind us of the risks miners face every day, and of the responsibility we all share to continue striving for safer workplaces.

As we remember all miners across the globe, we hold their families close in thought and prayer, offering compassion, strength, and the promise that their loved ones will never be forgotten.

2025 Fatality Current Total - 24

Fatality Reports | Mine Safety and Health Administration (MSHA). (n.d.). [Www.msha.gov. https://www.msha.gov/data-and-reports/fatality-reports/search](https://www.msha.gov/data-and-reports/fatality-reports/search)

Highwall Collapse Nearly Turns Fatal

In September 2024, a front-end loader operator at a surface mine narrowly escaped death when a 50-foot section of highwall gave way. The falling material crushed the loader's cab, trapping the operator's legs and causing permanent injuries. While the miner survived, MSHA classified the event as a major ground control failure and issued a safety alert stressing that no equipment should ever be positioned directly beneath unstable highwalls (*MSHA, 2024a; Mining Connection, 2024*).

Why this incident matters:

Highwall collapses are a recurring hazard in surface operations. In this case, contributing factors included:

- Weak inspections. The wall had not been adequately examined after recent weather changes.
- Unsafe positioning. The loader was operating at the toe of the highwall, directly in harm's way.
- Plan breakdown. Elements of the mine's Ground Control Plan—like scaling loose rock and maintaining benches—were not effectively applied (*MSHA, 2024b; NIOSH, 2024*).

Key Takeaways for Crews

- Inspect highwalls from multiple angles before every shift, especially after rain, freeze-thaw cycles, or blasting.
- Never park or operate equipment beneath hazardous overhangs.
- Scale or blast loose material before starting work.
- Reinforce exclusion zones with signs, berms, or physical barriers.

The bottom line:

This was a close call with life-changing consequences. Ground control hazards don't leave much room for error—if ignored, they quickly turn from near-misses into fatalities. Consistent inspections, strong Ground Control Plans, and clear no-go zones save lives.



Mine Safety and Health Administration. (2024a). Highwall failure accident — Safety alert. U.S. Department of Labor.

Mine Safety and Health Administration. (2024b, May 16). Final report — May 16, 2024 fatality (highwall/excavator). U.S. Department of Labor.

Mining Connection LLC. (2024, November 19). Incident involving highwall collapse spurs MSHA safety alert. Mining Connection.

National Institute for Occupational Safety and Health. (2024, October 9). Mining and ground falls. Centers for Disease Control and Prevention.

HIGHWALL COLLAPSE

NEARLY TURNS FATAL

THE POWER OF A WALL -A GRIM REMINDER

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Spotlight: Ground Control in Surface Mining – Highwall Stability in Winter

As the temperatures drop and the first signs of frost spread across mining regions, surface operations face a hidden adversary: ground control challenges intensified by winter conditions. Highwall stability, already one of the most critical safety concerns in surface mining, becomes even more unpredictable when moisture, freezing cycles, and weakened rock structures combine to create a perfect storm.

The Freeze-Thaw Effect

One of the most significant hazards comes from repeated freeze-thaw cycles. Water seeps into cracks and joints within the highwall during the day. Overnight, as temperatures plunge, that water freezes and expands, prying rock apart piece by piece. By the next shift, an area that seemed stable yesterday may be waiting to fail today. These small, unnoticed changes often precede major ground failures—posing dangers to workers, equipment, and production schedules.

Moisture and Weight

Winter often brings increased precipitation in the form of rain, sleet, or snow. Moisture adds weight to highwall material, reducing cohesion and increasing the likelihood of slides. Operators must be vigilant in recognizing drainage issues and ensuring water is diverted away from critical wall faces. Poor drainage design or clogged ditches can accelerate erosion, turning minor ground movements into catastrophic collapses.

Equipment and Traffic Near Highwalls

It's not just the rock that's under stress in the colder months—equipment operators face reduced visibility, slick roadways, and limited escape routes if a highwall fails. A truck idling too close to a compromised wall or a dozer pushing spoil without recognizing sloughing material can create unnecessary exposure. This is the season when every foot matters—maintaining proper setback distances from the edge of the highwall is not just best practice, it's a lifesaving measure.





CONTINUED

Spotlight: Ground Control in Surface Mining – Highwall Stability in Winter

Monitoring and Inspections

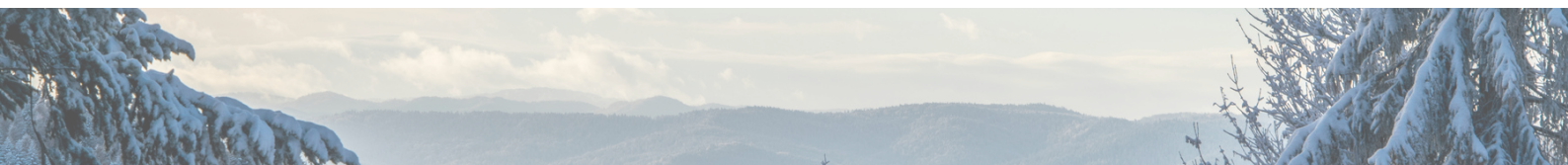
Winter ground control requires heightened inspection routines. Daily walkarounds may not be enough—conditions can change within hours. Using tools such as laser scanning, drone imagery, or even careful photographic documentation can help track changes in highwall integrity. Supervisors and safety professionals should encourage a culture of reporting “small” cracks or sloughs before they become major failures.

Culture of Awareness

Perhaps the most powerful tool in preventing highwall accidents this winter is **awareness**. Reminding crews that winter changes the behavior of rock and soil instills a sharper sense of caution. Toolbox talks that focus on spotting early warning signs—cracks, bulges, unusual sounds, or freshly fallen material—give miners the knowledge and confidence to act before it’s too late.

Closing Thought

Ground control in winter is not just about geology—it’s about vigilance, planning, and teamwork. The highwall doesn’t take days off for the holidays, and neither can our attention. By understanding how winter magnifies existing risks, and by reinforcing proactive inspection and safe work practices, we ensure every miner goes home safe, no matter the season.



Toolbox Talk: Highwall Safety

Introduction:

Highwalls are a constant part of surface mining operations, but they also pose one of the greatest risks to miners working near them. Ground conditions can change quickly, especially with weather, blasting, or equipment vibrations. A highwall that looks stable can still fail without warning. Understanding the hazards and applying safe work practices is key to preventing accidents.



Discussion Points:

Recognize Instability:

- Watch for warning signs such as cracks at the top of the highwall, loose material at the base, water seepage, or bulging in the wall. These can indicate that a failure is likely.

Maintain Safe Distances:

- Never work or park equipment directly at the toe or edge of a highwall unless it is necessary and approved. Always give yourself a safety buffer when possible.

Weather Impacts:

- Rain, freezing and thawing cycles, and wind erosion all weaken highwalls. Conditions should be reassessed after storms or temperature changes.

Controlled Access:

- Only authorized personnel should be near highwalls. Barriers, berms, or signage should be used to prevent accidental entry into hazardous zones.

Communication:

- Operators, spotters, and ground personnel must stay in constant communication when working near highwalls. Clear communication helps ensure everyone knows where it is safe to be.

Daily Inspections:

- Highwalls should be examined every shift by a competent person. Document any hazards found and take corrective action immediately.

Closing Message

Highwalls don't give second chances. A single collapse can be fatal and may also damage equipment or cut off escape routes. By staying alert, recognizing hazards, and respecting safe distances, we protect ourselves and our team.

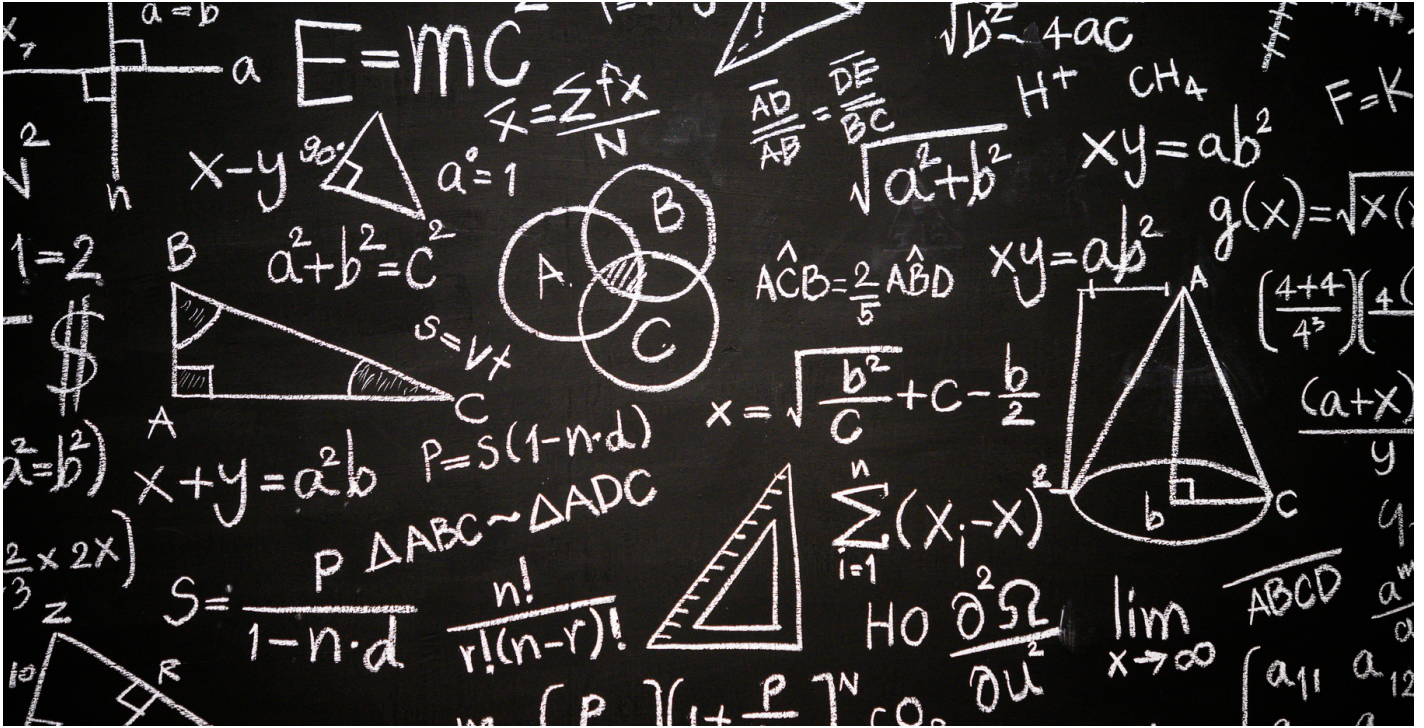
Takeaway Question to Ask the Crew:

What are some warning signs of a highwall failure, and how do we respond if we see them?



DID YOU KNOW?

Highwall Mining and NIOSH's ARMPS Software



Highwall mining has played a unique role in bridging the gap between surface and underground coal mining. Emerging in the late 1960s and early 1970s, highwall mining was developed as a method to recover coal left in the highwall after contour and strip mining operations. Using continuous mining machines that operated remotely from the surface, miners could drive parallel entries into exposed coal seams without sending workers underground. This method proved especially valuable in Appalachia, where thin seams and steep terrain made traditional surface mining difficult or uneconomical.

By the 1990s, highwall mining evolved with the introduction of modern continuous miners and launchers, enabling operators to reach deeper into the seam—sometimes extending over 1,000 feet into the highwall. Although the practice increased resource recovery, it also introduced significant geotechnical risks. Highwall collapses, roof falls within entries, and ground control failures became central safety concerns, highlighting the importance of effective engineering design and monitoring tools.



ARMPS Software

To address these challenges, the National Institute for Occupational Safety and Health (NIOSH) developed the Analysis of Retreat Mining Pillar Stability (ARMPS) software. Originally designed in the 1990s to evaluate pillar stability in retreat mining, ARMPS was later adapted to address highwall mining applications. The program uses engineering equations and empirical data to predict whether mine pillars and web structures can withstand applied loads without failure. *In short... smart stuff.*

For highwall mining, ARMPS provides mine planners with a way to design web pillars, assess entry stability, and balance coal recovery with safety margins. By simulating stress distributions and evaluating design factors, the software helps engineers reduce the likelihood of ground control failures that can endanger

ARMPS has since become a standard tool in the industry, with its recommendations integrated into many highwall and retreat mining plans submitted for regulatory approval.

The ongoing use of ARMPS illustrates how research and technology can transform mining practices. By combining decades of mining data with advanced modeling, NIOSH has given the industry a critical tool to both maximize recovery and protect worker safety in one of the most challenging ground control environments.



Photo Credit: Cat.com

References

Mark, C., & Chase, F. E. (1997). Analysis of retreat mining pillar stability (ARMPS). Proceedings of the New Technology for Ground Control in Retreat Mining, NIOSH IC 9446, 17-34. Pittsburgh, PA: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health.



MENTAL HEALTH

IN MINING



Mental health is often the hardest topic to talk about — yet it's one of the most important. Behind every hard hat is a person carrying stress, worries, and responsibilities that can't always be seen. Taking care of our minds is just as vital as protecting our bodies, and it's time we make that part of the safety conversation.

Behind the Hard Hat: Protecting the Mind

Mental health is as important to a miner or construction worker's safety as any piece of protective gear. While we focus daily on preventing physical injuries, silent struggles like stress, depression, and anxiety often go unnoticed — and they can be just as dangerous.

Across the construction and mining industries, suicide rates are among the highest of any occupation. Long hours, physical strain, inconsistent work schedules, and a “tough it out” culture take a heavy toll. Many workers hide emotional pain behind exhaustion or irritability, fearing judgment if they speak up.

Change begins with awareness. Supervisors, safety leads, and co-workers can make a difference simply by starting honest conversations. Leadership that treats mental health as part of safety culture — not separate from it — helps break stigma. Regular check-ins, open communication, and mental-health education during safety meetings show workers that their well-being matters. Programs like Employee Assistance, peer support, and crisis hotlines are valuable tools, but the greatest impact comes from compassion on the jobsite. When we recognize stress early and support one another, we build more than structures — we build trust and community.

Every worker deserves to go home safe in body and in mind. By including mental health in every safety plan and every conversation, we strengthen the foundation of our entire industry.





THE WELLNESS WATCH



Quick Insights: Wellness News in a Glimpse

The Wellness Watch is a monthly feature dedicated to raising awareness about chronic diseases and the impact they have on individuals, families, and communities. Each edition highlights a different condition, offering insight, support, and practical knowledge to encourage healthier lifestyles and stronger awareness.

While Hard Hat Headlines is rooted in the mining community, The Wellness Watch extends beyond the industry to remind us all that health is our most valuable resource.

Risk Factors

Several factors can increase the chance of developing high blood pressure:

- Lifestyle-related: Poor diet (high in salt and processed foods), lack of exercise, smoking, excessive alcohol.
- Health-related: Obesity, diabetes, high cholesterol, and sleep apnea.

Non-modifiable: Age, family history, and race (African Americans are at higher risk).

Signs and Symptoms

Most people don't feel any symptoms. When signs do occur, they may include:

- Severe headache
- Blurred vision
- Chest pain
- Shortness of breath
- Nosebleeds

(These symptoms usually appear in cases of dangerously high blood pressure, known as a hypertensive crisis.)

In Focus: High Blood Pressure

What Is High Blood Pressure?

High blood pressure, also called hypertension, happens when the force of blood pushing against the walls of your arteries is consistently too high. Over time, this added pressure puts stress on the heart and blood vessels, increasing the risk of heart disease, stroke, and kidney damage.



Why it Matters?

Hypertension is often called the "silent killer" because it usually has no symptoms until significant damage is done. Left uncontrolled, it can lead to:

- Heart attack and heart failure
- Stroke
- Kidney disease
- Vision loss
- Cognitive decline



Prevention and Management

The good news is hypertension can often be prevented or controlled with healthy choices:

- Eat smart: Follow a balanced diet such as the DASH (Dietary Approaches to Stop Hypertension) plan.
- Stay active: Aim for at least 150 minutes of moderate activity per week.
- Limit sodium: Keep salt intake low (ideally under 1,500–2,300 mg per day).
- Maintain a healthy weight.
- Avoid smoking and limit alcohol.
- Manage stress: Practice relaxation and sleep hygiene.
- Check blood pressure regularly.

For additional information visit:



www.heart.org



Hunting Season Safety

For many miners, fall means more than cooler weather — it's hunting season. Just as we double-check our gear before heading underground or working a highwall, hunters should treat every trip into the woods with the same level of caution and respect for safety. Here are a few tips that connect the best practices of mining safety to your time in the field:

1. PPE in the Woods

On the job site, PPE keeps us visible and protected. In the woods, blaze orange is your high-vis vest. Make sure you're visible to other hunters at all times — it's the equivalent of making sure your cap light is on underground.

2. Know Your Surroundings

In mining, ground control is about awareness of the terrain. Hunting is no different. Identify safe zones of fire, be aware of where other hunters are located, and know your backstop before you ever pull the trigger.

3. Equipment Checks

Just like inspecting machinery, inspect your firearm and gear before every trip. A faulty safety on a rifle can be just as dangerous as a bad brake on a haul truck.

4. Communication Counts

At the mine, we don't head into a working area without letting others know. Do the same when hunting: share your plans, hunting zone, and return time with a friend or family member.

5. Fatigue and Judgment

We all know working tired leads to accidents. The same goes for hunting. If you're worn out from a long shift, think twice before heading to the woods with a firearm.

A Fun Reminder:

Just as miners proudly hang their hard hats at the end of the day, hunters can hang their tags with pride — but only if they do it safely. Remember: "No deer is worth an accident."





photo credit: pahistoricpreservation

Marianna Coal Mine Disaster

Tribute to the Marianna Coal Mine Disaster

On the morning of November 28, 1908, the quiet town of Marianna, Pennsylvania, was shaken to its core. In an instant, an explosion inside the Marianna Coal Mine claimed the lives of 154 miners. It remains one of the darkest days in the history of American mining, a day etched into the memory of families and generations who followed.

Those men went to work with the same hopes as every miner before and after them—providing for their loved ones, building a future, and trusting that their strength underground would create stability above it. Instead, the community was left with grief, unanswered questions, and a stark reminder of the dangers miners face each day.

The loss was not measured in numbers alone. Each miner had a name, a story, and people who waited for them to return home. Wives became widows in a single moment. Children were left to grow up without fathers. Entire families carried the weight of absence, and the echoes of that loss still reach across the generations.

Yet, from tragedy came resilience. The disaster sparked national attention and helped fuel conversations about mine safety and the urgent need for reform. While progress has been uneven over the decades, the sacrifice of the Marianna miners gave voice to a truth that could no longer be ignored—that no life should be traded for production.

Today, more than a century later, we pause to honor those 154 miners. We remember their courage, their labor, and their sacrifice. We stand in solidarity with their families, whose pain reshaped the community and whose perseverance ensured their loved ones were never forgotten. And we acknowledge the miners of today, who continue to walk into the darkness so the world may have light and energy.

The Marianna Coal Mine Disaster is not only a story of loss—it is also a legacy of strength. It reminds us that the true measure of a mining town is not in the coal taken from the ground, but in the people who lived, loved, and worked together despite unimaginable hardship.

This November, as we reflect on the past, we carry forward the memory of those who gave their lives at Marianna. Their sacrifice laid the foundation for every step toward safer mines. To honor them is to continue striving for a future where every miner returns home.





Your Voice

As Hard Hat Headlines continues to develop into a trusted resource for miners, safety professionals, and industry leaders, we want to ensure the content remains both relevant and impactful.

To achieve this, HHH is seeking input directly from you—the mining community. What issues, challenges, or innovations would you like to see explored in future editions? Whether it's emerging safety practices, regulatory updates, technological advancements, or lessons learned from the field, your suggestions will help guide the research and writing to better serve the needs of those who work in and support the mining industry every day.

We encourage you to share your ideas so that Hard Hat Headlines can continue to highlight the topics that matter most to you and your teams.



Please note that while not all submitted ideas may be utilized in future editions, every submission will be thoroughly reviewed and given full consideration during the editorial process.



Mission Statement

Hard Hat Headlines is committed to delivering independent, insightful, and timely news to the mining community. Our goal is to engage miners, safety professionals, and industry leaders by highlighting safety trends, regulatory updates, and real-world experiences from the field. We prioritize transparency, accuracy, and objectivity, using only publicly available information to provide a trusted source of information. By sharing stories, lessons learned, and innovative practices, we aim to foster a safer and more informed mining industry. Hard Hat Headlines operates independently of any government agency or private organization, ensuring that our reporting remains unbiased and dedicated solely to the needs of our readers.



If you or someone you know is struggling with mental health challenges, drug addiction, or thoughts of suicide, please don't ignore the warning signs—reach out, speak up, and get help. You are not alone, and support is always available.

Disclaimer:

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