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What have we learned from writing the book? Implementation of the International Network for Acid Prevention guidance to deliver successful cover systems

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Abstract

Designing and implementing effective cover systems for tailings storage facilities (TSFs) and mine rock stockpiles (MRSs) remains a central challenge in mine closure, requiring integration of sound geotechnical, geochemical and hydrological principles with practical construction and long-term performance considerations. Following almost 10 years of implementation of the guidance provided in the International Network for Acid Prevention (INAP) Global Cover System Design – Technical Guidance Document (2017), a series of cross-disciplinary lessons has emerged that strongly reinforce the significance of this industry leading, best practice guidance. These insights highlight the importance of robust conceptualisation, transparent closure objectives and the need to design with clear awareness of both fixed and flexible system constraints. Lessons drawn from operational sites demonstrate recurring themes related to future land use, climate, material limitations, water management, landform stability, vegetation establishment and construction planning and quality execution. Together, these insights reinforce the basis for the INAP-applied framework structured around '8 ways to ensure success' in cover system design.

A critical learning is that successful cover system performance begins with clear definition of landform and closure objectives, followed by a realistic assessment of climate drivers, hydrological pathways and material properties. Elements such as climate and intrinsic material behaviour cannot be changed, while others such as material availability, hydrogeological setting, post-mining land use and timeframes are difficult to modify but must be carefully characterised to support credible design outcomes. Construction practices, by contrast, represent an area where significant influence can be exerted to enhance long-term performance, provided appropriate quality control and verification processes are in place. The INAP lessons emphasise the need for conceptual models that accurately represent water and oxygen fluxes, landform behaviour and long-term surface evolution, supported by field data and monitoring results.

The lessons learned by Okane over the past 30 years in the planning, design and execution of cover systems for TSFs and MRSs aligned with INAP guidance principles can deliver successful cover systems through integrated, evidence-based design informed by site-specific understanding, adaptive management and a commitment to long-term performance.

Keywords: *tailings storage facility, cover system, mine rock stockpile, roadmap to closure, mine closure, leading-practice guidance*

1 Introduction

For 30 years Okane Consultants (Okane) has been assessing need for, designing, supporting construction of, and monitoring cover systems through an interdisciplinary lens. Many of the challenges in designing and constructing a suitable cover system on a tailings storage facility (TSF) or a mine rock stockpile (MRS) remain

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consistent over this time. More than 10 years ago, Okane, as part of an international consortium operating under the auspices of the International Network for Acid Prevention (INAP), led the development of the *Global Cover System Design – Technical Guidance Document* (2017).

After more than a decade of implementation, design principles from the INAP guidance have proven critical in improving design defensibility, enabling adaptive management, and enhancing the long-term performance and regulatory acceptance of cover systems as part of mine closure strategies. 'After writing the book', Okane continued to refine practical application of the INAP lessons learned list with '8 ways to ensure success' in cover system design.

2 What is a cover system?

A cover system is a technology in the mining industry that falls within the broad range of applied sciences aimed at preventing and/or mitigating potential risk arising from mining activity. In simple terms, cover systems enable the reclamation of landform surfaces created through mining activities. They are typically designed to limit net percolation and/or control oxygen ingress into the landform during operations and closure, thereby managing the risk of metal leaching and acid rock drainage (ML/ARD).

In fact, cover systems are systems in the true sense of the word, in that their performance and performance expectations are intrinsically linked to the underlying materials and hydrologic conditions (i.e. the landform itself), as well as vegetation and site-specific climate conditions. For this reason, although cover systems are often referred to as caps, liners or simply covers, they are far more than the cover material alone. When a cover system is conceptualised solely as a material layer or layers, the resulting design approach is frequently flawed. This narrow perspective tends to promote isolated layer-by-layer design, rather than an integrated systems-based approach that accounts for the interacting factors that ultimately govern cover system performance.

Cover systems serve as foundational elements in achieving agreed-upon post-mining land uses. They support surface reclamation of mined landforms while providing a stable, reliable and sustainable interface between the landform and the surrounding environment. Within the mining industry, this interface is intentionally designed to evolve into either an aquatic (water cover) or terrestrial (dry cover) ecosystem; both may also incorporate riparian components. The focus herein is on terrestrial, or dry, cover systems.

Design objectives for cover systems can vary; however, common objectives are typically developed to address physical stability and chemical stability, water-holding capacity and manage the interface between the biosphere and the mined materials in the landform. Physical stability of a cover system is related to the overall landform design and may address concerns related to surface water management, slope stability, dust and erosion control. Cover designs can also address chemical stability whereby water movement via net percolation or air movement via advection or convection through a cover system and into stockpiles of reactive mine rock is to be minimised, leading to reductions in geochemical activity or solute transport within the landform.

Types of cover systems as defined by INAP (2017) can include:

- erosion protection
- store-release cover
- enhanced store-release cover
- barrier-type cover
- engineered layer cover
- saturated soil or rock.

A cover system operates with the environment, and some environmental factors like climatic setting cannot be changed or engineered out, some factors like material properties (choosing the right rock or adding a manufactured layer) can be influenced, while other factors like construction technique are open to optionality to improve cover system performance. Every cover system functions on a continuum of performance functionality, where different mechanisms are dominant, depending on site-specific conditions (O'Kane 2024). Put simply every cover system is unique.

3 Eight ways to ensure success – reinforcing key International Network for Acid Prevention principles in cover system design

With more than 30 years of cover systems experience and having led the development of the INAP guideline 10 years ago, Okane is in a unique position to share the 8 ways for successful cover system design, construction and performance.

3.1 Start with future land use

Define and document future, or returning, land use for the mine landform, which considers the landform in the context of the site as a whole.

Mining landforms such as TSFs and MRSs vary widely in size, shape and location. Some are close to urban areas, while others are constructed in very remote settings. One thing is common in all cases: designing an effective cover system requires a clear understanding of who will use the landform in the future and how it will be used.

Future land use, whether it is a returned, transitioned, or alternative use, is a critical input to cover system design. It sets the direction for the entire design process and provides the framework against which performance requirements should be defined.

For example, if grazing is the intended future land use, the cover system must do more than control net percolation. It also needs to support suitable fodder or forage (with consideration for growth media depth and nutrients), accommodate livestock watering points and high-traffic areas (areas with limited ground cover) and incorporate slope gradients that are safe for animals while minimising erosion risk (i.e. cows will not walk on rock cover slopes but will walk around rocky areas).

The first way to ensure success in cover system design is to be directionally accurate with the desired outcome before seeking precision through refinement. A clear understanding of post-mining land use requirements across the whole site – not just the landform – and designing with those requirements in mind from the outset, greatly improves the likelihood that conceptual designs will be robust, practical and ultimately accepted.

3.2 Define cover system objectives

Define and document clear objectives for the cover system, which arise from land use expectations.

Collaboratively developed, clearly communicated and fully documented cover system objectives are essential for defining what success looks like and how it will be measured. In practice, cover system design must balance competing values and outcomes arising from:

- business operating requirements (internal, short term)
- business closure outcomes (internal, long term)
- regulatory expectations (external, short and long term), including managing environmental risk
- post-mining landowner or land user requirements (external, long term).

These competing drivers inevitably create tension during the design process. This tension is healthy, as it encourages disciplined discussion and helps optimise the design around agreed and defensible outcomes.

Well-defined objectives should provide sufficient detail to:

- inform on design criteria such that design can be aligned with objectives
- clearly define success criteria within known engineering and operational limits
- establish hierarchy for decision-making
- distinguish 'show-stoppers' or fatal flaws from acceptable trade-offs
- separate mandatory performance requirements from subjective 'nice to haves'.

Clearly articulated cover system objectives support robust decision-making by informing on tools such as scenario planning and multi-criteria assessments, for example. This enables transparent comparison and scoring of scenarios, alternatives and designs. They are equally valuable in investment evaluation and formal design review processes, for example, assessing whether the design process delivers the business and stakeholder requirements.

The authors also consider the concept of 'informed simplicity' as being foundational to successful cover system design, construction and performance, and therefore cover system objectives. The concept is derived from Frederick (2007) who originally referred to 'informed simplicity' as 'simplicity' defining it as '…the worldview of the child or uninformed adult…'. Frederick (2007) defines 'complexity' as '…awareness of the complexity of systems, but difficulty discerning patterns…', and 'simplicity' as '…an enlightened understanding that recognizes underlying patterns and can therefore make the complex appear simple…'.

Figure 1, from Geoco (2026), is an adaptation of Frederick's concept.

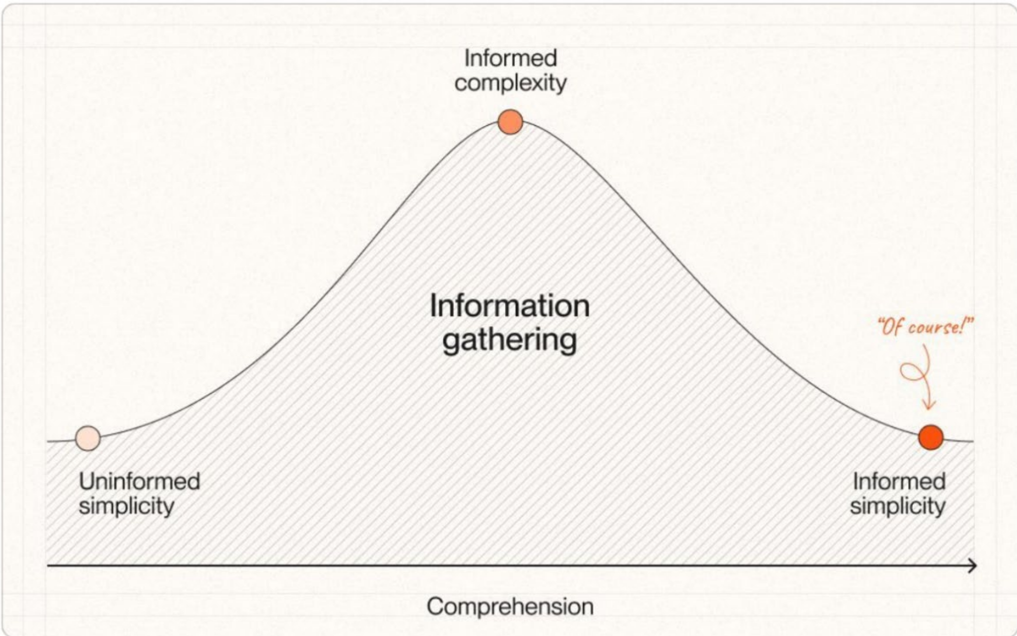

Figure 1 Uninformed simplicity versus informed complexity versus informed simplicity, from Geoco (2026) and adapted from Frederick (2007)

Within the context of this paper, application is along the lines of initially 'uninformed simplicity', where many stakeholders typically take the approach, for example, '…we just need to close the tailings storage facility…'. From there, the tendency is to move into 'informed complexity', where there are literally '…hundreds if not thousands of interacting technical, environmental, social, regulatory, and governance issues…'. Eventually, however, one reaches a condition of 'informed simplicity'; for example, '…future land use should be the organising principle behind a landform's closure plan, and a cover system is the interface between the biosphere, and the landform…'. In essence, '…what do we want the land to become?...'.

This paper advocates that the concept of keeping things as simple as possible, or more specifically, functioning with 'informed simplicity', is best applied early, rather than later in a project and/or during closure planning. Hence, ensuring that well-defined closure objectives that serve to achieve 'informed simplicity' sooner rather than later, and which are collaboratively developed and transparently documented, allows a better start to conceptualising cover system design, construction and performance.

3.3 Understand site-specific characteristics

Ensure appropriate characterisation of site-specific conditions (climate, materials, hydrogeology, etc.), such that cover system designs from other sites are not simply transferred to the current site, without a full appreciation of the impact of even small differences between sites on cover system design and performance.

Anyone who has spent more than a few minutes in the mining industry knows that not all rock is created equal and that every site is unique. Site-specific conditions for climate, materials, hydrogeology, hydrology and terrain all play a role in how a cover system should be designed.

Looking specifically at materials, some materials are reactive, some are competent and durable, others are weak or degrade rapidly once exposed. Others can oxidise, generate heat, or even self-ignite. Geologists may even ask: 'does it fizz when I lick it?'

In cover system design, it is critical to appropriately characterise and describe all materials that will, or could, be used in the cover system, including mined rocks and soils. Assumptions about material behaviour are a common source of design failure when they are not supported by representative data.

Key questions to ask about site materials include their:

- particle size distribution (PSD) when mined and placed (often very different from drill core results)
- plasticity and potential for shrink–swell behaviour
- permeability/conductivity in relation to water
- leachability and geochemical reactivity (in the short and long term)
- ability to support vegetation from a nutrient perspective
- ability to retain and supply moisture to vegetation (plant-available water capacity)
- erodibility under rainfall, run-off and wind exposure
- porosity, including implications for oxygen ingress and moisture storage.

Understanding these characteristics, individually and in combination, is fundamental to designing cover systems that work in the long term.

It is very common for cover system design to commence under tight timeframes, only for it to become evident that key rock or soil materials, often proposed simply because they are readily available, are poorly characterised and that proxy data are often used. This lack of material knowledge introduces uncertainty and inaccuracy into the design process.

In response, designers often default to conservative, risk-averse solutions, copying designs and attributes from other sites as a proxy for uncertainty to cover the lack of fundamental knowledge. In Okane's experience, this frequently leads to overly complex designs that incorporate unnecessary and costly elements, not because they are demonstrably required, but because material behaviour is unknown or poorly understood.

For example, assuming a saturated hydraulic conductivity (K_{sat}) that differs by an order of magnitude from the true value can fundamentally change cover system design decisions. Such uncertainty may drive the inclusion of a low-permeability barrier layer (for example, a high-cost geosynthetic liner) to manage downward percolation or the addition of a capillary break layer to mitigate upward moisture migration dragging salts into the vegetation root zone. With better material characterisation, these measures may prove unnecessary or could be simplified, resulting in more efficient and cost-effective designs.

Equally, across a mine site there may be alternative materials that may have more favourable characteristics for a cover system than the current mined rock, and while not always available today, they may become available in the future. If well managed through segregation and stockpiling, they have the potential to improve performance and reduce cost of the cover system at closure. Minimising the available design to the use of currently available materials may be limiting the design potential when considering the whole life of mine context.

The third way to ensure success is to understand that it is acceptable, and often unavoidable, to begin a design process with uncertainty in key inputs due to poor site characterisation and especially limited material characterisation. This is an unfortunate industry norm but only should be seen as acceptable up to a point. Carrying uncertainty with respect to material characteristics beyond the initial conceptual design phase drives increasing conservatism in design decisions and, in turn, higher execution and closure costs.

Conversely, well-characterised materials significantly reduce uncertainty, support defensible and proportionate design decisions, and help avoid conservative over-design driven by incomplete information. Investing in site-wide characterisation early also accelerates progression from concept through to execution, improving both design efficiency and overall project outcomes.

3.4 Cover system and landform design are integrated

Consider as a fundamental component of cover systems the concomitant relationship between cover system design, construction and performance, and mine landform design, construction and performance.

Cover systems can act as a barrier between the biosphere and the mine waste materials in a TSF or MRS. In many ways, a cover system is like the icing on a cake: it is the visible surface of the final landform and influences how people and ecosystems interact with it, but it is only one part of the overall integrated landform system.

Icing can only do so much to improve the quality of an 'ordinary' cake. Likewise, a cover system can only partially compensate for limitations in how a TSF or MRS is designed and constructed. Designing and building the 'cake' well, by incorporating closure considerations from the outset, can significantly improve landform performance. In many cases, this approach can simplify the required cover system and reduce overall closure complexity and cost.

This concept is reinforced by research from Okane and Earth Systems for INAP when in 2020 they published *Rock Placement Strategies to Enhance Operational and Closure Performance of Mine Rock Stockpiles – Phase 1* (INAP 2020), followed by Okane's INAP report – *ARD/AMD Source Control for Mine Rock Stockpiles – Phase 3* in 2024 (INAP 2024). Both publications focus on source control to improve environmental and economic outcomes, essentially building a better 'cake' rather than relying on thicker and more complex 'icing'.

Reducing ARD and ML generation at the source can substantially reduce the performance demands placed on a cover system and improve the long-term stability and functionality of the landform as a whole.

For MRSs, this outcome can be achieved through effective pre-construction planning, including:

- selective placement of rock based on geochemical characteristics
- development of operational strategies that manage ARD and ML risks throughout MRS construction.

The fourth way to ensure success is to integrate landform design and cover system design early as this helps align operational practices with closure objectives, strengthens the overall performance of the landform and reduces potential limits on the cover system when dealing with very 'ordinary cakes'. Ideally the cover system should be seen as part of the holistic landform design and not an afterthought.

3.5 Incorporating your catchment

Consider the influence of catchment run-on and lateral groundwater seepage onto and/or into the mine landform to ensure understanding for these conditions are included as part of performance expectations for the cover system.

One primary function of the cover system is to manage net percolation over time. Even with low rates of net percolation, water can accumulate over time within the landform and gradually wet up the mine waste profile. As wetting progresses, seepage may occur under suitable conditions. Depending on the mined rock or tailings, the net percolation water can accumulate ML over time and move potential contaminants towards receptors, potentially resulting in long-term impacts to receptors.

Before seepage becomes visible, groundwater mounding can develop at the base of the landform as net percolation, driven downwards by gravity, accumulates. Once the hydraulic pressure within the landform exceeds the outside atmospheric pressure and rock water-holding capacity, seepage will initiate, through release of pressure, and the landform's unsaturated water balance will return to equilibrium.

Water balance conditions at the base of the landform are not controlled by net percolation alone. Most landforms are not constructed on flat ground; instead, they are typically located on undulating terrain. As a result, surface water from surrounding catchments can be focused through preferential pathways beneath the landform, further contributing to water accumulation and seepage risk. Topographic pathways focus water flows under the landform, providing conduits for water flows into and out of the base of the landform. If not understood and managed from the outset, these pathways can accelerate the rate at which net percolation enriched with ML from the rock mass can be transported into the wider environment.

The fifth way to ensure success is to ensure that cover system design must consider the full water balance of the landform. Performance considerations do not stop at the mine waste directly beneath the cover. The design process needs to account for routes along which water and solutes from net percolation will travel and identify all contributing factors within the source–pathway–receptor framework for the landform.

This includes understanding phreatic surface changes over time, subsurface flow paths, external water inputs, and how water accumulates or discharges at the base of the landform. Clearly defined and understood basal flow conditions are a critical input to an effective and defensible cover system design.

3.6 Management of surface water

Ensure surface water management onto, within, and/or from the mine landform is considered part of cover system design.

Building on the importance of water from the fifth lesson, understanding the long-term surface water management framework that the cover system will operate within is critical to designing for long-term success. Key questions for surface water management that influence cover system design include:

- How much water will run on to the landform and on to the cover system?
- How much water will run off the landform and the cover system?
- Will the amount of water running on to the landform change over time, through future mine development, future rehabilitation outcomes or even looking into the future through climate change?
- Is the intent to store water within the cover system to support vegetation development and retention?
- Is the intent to shed water to manage landform stability?
- Where does the water go when it leaves the landform?
- Is there a critical receptor downstream that needs to be protected?

- Does drainage from the landform consolidate flows that need to be integrated into wider water management infrastructure or the natural environment?
- Is the landform adjacent to a watercourse that when flooding could have direct contact with the landform and cover system?

The answers to these questions can significantly influence how the cover system needs to be designed. For example, future construction of a neighbouring landform may add contributing catchment area, increasing the run-on component considered in the cover system water balance.

This has important design implications. Depending on the type of cover system, the additional water may need to be stored within the cover and removed through evapotranspiration to manage net percolation via a thicker store-release layer, or it may simply increase net percolation through the cover system if storage is already maximised. Alternatively, excess water could oversaturate the cover, leading to physical instability, or flow across the surface, increasing the risk of erosion and damage to the cover system.

The sixth way to ensure success is that successful cover system performance depends on understanding and designing for long-term surface water management, both on and around the landform. Cover system performance should not be assessed in isolation; it is strongly influenced by the broader surface water regime. Giving consideration to how surrounding run-on/run-off, drainage patterns or flow concentrations interact with the cover system is a critical factor in achieving long-term stability and effectiveness.

3.7 Know your cover material characteristics, availability and costs

Early in project development, ensure sufficient volume of cover material is available (of the appropriate characteristics, and at the planned unit rate(s)).

It is possible to have an excellent cover system design that uses the best available rock types on site, selected directly from the block model. However, practical constraints can limit whether those materials are actually available. One rock type may be preferred/required by operations for haul roads and run of mine (ROM) pad construction, fully consuming the resource. Another may only be available during the early stages of a pit pushback and represent less than 1% of the total mined material. In another case, none of the required rock types are mined during the final 10 years of operations and are therefore unavailable for use when installing a cover system.

These rock types should still be considered in the cover system design, but with caution. Their availability, timing, competing operational demands and long-term supply constraints must be explicitly assessed and reflected in the design to ensure the solution is practical, deliverable and sustainable over the life of the mine.

Haul roads and ROM pads can be re-mined once they are no longer required at closure. However, repeated vehicle movements typically alter the PSD of the material compared to its original mined state, increasing the proportion of finer fractions and potentially changing its suitability for use in a cover system.

Stockpiling large volumes of rock can also be challenging. Space constraints, site layout, or legally mandated clearing limits may restrict the ability to store material for future use. For context, a 2 km^2 TSF requiring a 1 m-thick layer of a specific rock type would need 2 million cubic metres of that material for just one layer of the cover system.

Without access to the right rock types at the right time, cover system performance can be compromised, and construction costs can increase substantially. Material availability, timing and quality therefore need to be treated as core design inputs, not afterthoughts.

Adding to the right rocks at the right time requirement, an effective cover system needs to consider whether the rocks are in the right location. A key factor in the execution of a cover system is the cost to load and haul cover system materials. Unexpected cost increases through unplanned long haulage are often a trigger for late-stage design changes that will have an impact on cover system performance.

The seventh way to ensure success is to understand the importance of starting the cover system planning early and involving all relevant stakeholders in the design process. Long-term mine planning, geology, mine services, environmental approvals, and financial planning all play a critical role in determining whether suitable materials can be made available when needed. Early alignment across these disciplines helps confirm whether a high-performance cover system is achievable, or whether higher costs are likely or if reduced performance outcomes will need to be accepted, if costs are unacceptable.

3.8 Ensure constructability and apply quality assurance and quality control

Ensure the cover system is constructible, i.e. that design complexity does not introduce challenges for implementation, and appropriate quality control and quality assurance (QA/QC) during cover system construction can be achieved.

Every mine site has a 'Bob the Builder' mindset of 'Can we build it? Yes, we can!' This attitude is often valuable, but it becomes risky when cover system designs are not tested against real-world constructability constraints. Once a design is subjected to a constructability review, limitations related to equipment capability, site conditions, logistics, and workforce availability or capability often emerge.

Constructability reviews help identify issues early, including:

- unrealistic construction sequencing or durations
- conflicting details between disciplines (for example civil works versus electrical requirements for monitoring equipment)
- incompatible or impracticable construction methods
- poor coordination between work crews or contractors
- ignored material availability constraints, including long-lead or limited-supply items
- seasonal constraints such as rainfall, snow, sustained high winds
- unsafe or high-risk construction approaches.

Incorporating constructability reviews into the cover system design process reduces delivery risk, improves safety, and increases the likelihood that the design can be implemented as intended.

The second part to construction is QA/QC during construction. Deviations from the design during execution can have significant impacts to long-term performance, cost and ability to deliver the future agreed land use. Implementing a rigorous QA/QC process during construction will support discussions regarding defensible design and performance, and allow for implementation of adaptive management as there was a known level of control applied at construction.

The eighth and final way to ensure success is to embed constructability reviews early and control quality during construction. Constructability reviews start at the conceptual design stage and are repeated throughout the cover system design process. Early reviews help identify fundamental feasibility issues before they become locked into the design.

As the project progresses into detailed design, the constructability review team should be expanded beyond the engineering designers to include construction supervisors, specialty subcontractors, project managers and field supervisors. Involving those who will ultimately build the cover system ensures the design is practical, safe and achievable within site, equipment and operational constraints.

QA/QC during construction is critical to ensuring long-term performance meets expectations, supports future discussions regarding a defensible engineering design and allows for adaptive management if there are deviations from expected performance.

4 Conclusion

Over the past 30 years, Okane has undertaken a continuous journey to better understand and design cover systems for mining landforms, with the aim of more effectively managing the risks associated with ARD and ML. The INAP (2017) Global Cover System Design Guidelines comprehensively outline the requirements for effective cover system design.

The 8 ways to ensure a successful cover system capture this experience:

1. Start with future land use.
2. Define cover system objectives.
3. Understand site-specific characteristics.
4. Cover system and landform design are integrated.
5. Incorporating your catchment.
6. Management of surface water.
7. Know your cover material characteristics, availability and cost.
8. Ensure constructability and apply QA/QC.

Experience shows these elements cannot be applied in isolation. They must be integrated holistically into the design and execution phases to achieve a successful outcome.

Further, the 8 ways discussed in this paper have been developed through Okane's global experience in modelling, testing, innovation, construction, performance assessment and long-term review of cover system designs. These lessons are drawn from projects across a wide range of climatic and environmental settings, from frozen environments to wet tropics and hot, arid deserts, and collectively support more robust designs and improved long-term outcomes for mine closure.

References

Frederick, M 2007, *101 Things I Learned in Architecture School*, MIT Press, Cambridge.

Geoco, T (Itsdesignertom) 2026, 'Let's talk about achieving informed simplicity', *Threads*, online forum post, viewed August 2026, https://www.threads.com/@itsdesignertom/post/DBj4j5mzHcd?hl=en

INAP (International Network for Acid Prevention) 2017, *Global cover system design technical guidance document*, https://www.inap.com.au/wp-content/uploads/global-cover system-design.pdf

INAP 2020, *Rock Placement Strategies to Enhance Operational and Closure Performance of Mine Rock Stockpiles - Phase 1 Work Program – Review, Assessment & Summary of Improved Construction Method*, accessed February 2026, https://www.inap.com.au/wp-content/uploads/2020-Jan-INAP-Improving-Stockpile-Construction-Phase-1-Final-Report.pdf

INAP 2024, *ARD/AMD Source Control for Mine Rock Stockpiles Phase 3*, accessed May 2026, 2024-6-Jun-27-1043-222-001-Source-Control-for-MRS-Ph-3-Rev-0.pdf

O'Kane, M 2024, 'Stories from a Quarter Century of Cover System Design – Lessons to Inform the Future', in D Sego (ed.), *Proceedings of the 47th British Columbia Annual Mine Reclamation Symposium*, The University of British Columbia, Vancouver.