ISO FORM 1
ISO TS/P 334

PROPOSAL FOR A NEW FIELD OF TECHNICAL ACTIVITY

PROPOSER:

Standards Australia

DATE OF CIRCULATION:

2026-05-29

CLOSING DATE FOR VOTING:

2026-08-21

A proposal for a new field of technical activity shall be submitted to the Office of the CEO (to tmb@iso.org), which will process the proposal in accordance with ISO/IEC Directives, Part 1, Clause 1.5.

Furthermore, a proposal will be considered as complete if every information field is complete and follows the guidelines for proposing and justifying a new field of activity given in the ISO/IEC Directives, Part 1, Annex C.

TITLE

(Please see the ISO/IEC Directives, Part 1, Annex C, Clause C.4.2)

Civil and Structural Design of Tunnels

SCOPE

(Please see the ISO/IEC Directives, Part 1, Annex C, Clause C.4.3)

This committee standardises the civil and structural design of tunnels and associated underground structures in soil and rock where they are integral to tunnel infrastructure. It covers tunnel-specific design interfaces including geotechnical design inputs, groundwater design actions and responses, ground reinforcement, structural linings, durability, ground-structure interaction, and the assessment and retrofitting of existing tunnels. Special cases such as immersed tunnels, cross passages forming part of tunnel systems, and underground stations may be considered only where the work concerns tunnel-specific civil and structural design and does not duplicate the remit of existing ISO or IEC committees. The committee is intended to provide a coherent framework for tunnel infrastructure performance, safety, durability, resilience and functionality, while recognising applicable existing standards for materials, systems, operations and environmental matters.

Excluded: groundwater monitoring methods, hydrogeological investigation methods, groundwater data acquisition and interpretation (ISO/TC 113/SC 8); air quality criteria, pollutant assessment, air velocity sensors, ventilation system design, fan dimensioning and ventilation equipment (including ISO/TC 146/SC 3 and ISO/TC 117); fire safety systems, life safety systems, emergency communication systems and railway-specific safety requirements or installations, including aerodynamics, overhead-line equipment, alarm systems and emergency systems (including relevant ISO/IEC committees and ISO/TC 269/SC 1 where applicable); road traffic safety management, traffic operations and traffic-control systems (including ISO/TC 241 where applicable); tunnel lighting and light sources (including ISO/TC 274 and relevant CEN work); product, material and execution standards for concrete, sprayed concrete, injection products, geosynthetics, waterproofing and drainage products (including ISO/TC 71 and ISO/TC 221); building and civil engineering information management/BIM, digital-twin information management and sustainability assessment methods as general cross-cutting subjects (including ISO/TC 59/SC 13 and ISO/TC 59/SC 17); environmental management and environmental impact assessments (including ISO/TC 71/SC 8 and relevant existing committees); hydraulic tunnels; above-ground structures; standalone underground utilities; building architecture and finishes; electrical

and communication systems; mining excavations; machinery and equipment design; and non-transport underground works.

PURPOSE AND JUSTIFICATION (Please use the field immediately below or attach an annex.)
(Please see the ISO/IEC Directives, Part 1, Annex C, Clause C.4.13)

There is currently no ISO committee responsible for the standardisation of civil and structural tunnel design as an integrated underground infrastructure topic. Worldwide, tunnel projects rely on a mixture of structural codes, geotechnical standards, national tunnelling guidelines, and project-specific “Deemed-to-Satisfy” criteria. This leads to inconsistent approaches to tunnel-specific design interfaces, challenges in comparing performance across jurisdictions, and difficulties in ensuring long-term safety, durability, resilience and efficiency across the lifecycle of underground infrastructure.

Internationally, tunnel design practice is mature but fragmented. Regions such as Europe, East Asia and North America apply different frameworks, including DAUB recommendations (Germany), Japanese Road Association tunnel standards, Chinese highway and railway tunnel standards, UK BD 78/99 and BS 6164, the FHWA highway tunnel guidance and DCRT-1-2010 (USA), PIARC Road Tunnel Manual, and relevant Eurocodes. These references provide substantial experience but are not harmonised globally or fully aligned with ISO committee structures. Recent major projects, including the Tianshan Shengli Tunnel, the Hong Kong-Zhuhai-Macao Bridge, the Shenzhen-Zhongshan Link, the Ryfylke Tunnel and the Ceneri Base Tunnel, further demonstrate the scale, diversity and international relevance of tunnel design practice.

This proposed Technical Committee will focus on tunnel-specific civil, structural and geotechnical design interfaces rather than product, system, operational or environmental standards. It will coordinate with, but not duplicate, existing ISO and IEC committees responsible for related subject areas, including concrete and material/product standards, groundwater methods, ventilation and fans, fire and life safety systems, lighting, railway-specific systems, road traffic safety, digital information management and sustainability assessment.

The increasing scale and complexity of underground construction highlight the need for consistent design principles governing the structural and geotechnical performance of tunnels, while respecting established national and regional requirements. The proposed work is not intended to replace national codes or prescribe a single global calculation method. Instead, it is intended to provide common terminology, performance principles, design interfaces and coordination guidance for tunnel-specific civil and structural design, supporting consistency where international projects must rely on multiple codes and project specifications.

A new ISO technical committee would:

- Establish consistent international principles for tunnel-specific civil and structural design, including geotechnical characterisation, actions and load combinations, ground-structure interaction, durability, lifecycle performance and resilience.
- Address design interfaces not coherently covered in existing ISO standards, such as segmental lining behaviour as a structural system, observational design, ground improvement interfaces, groundwater design actions, waterproofing/drainage as design interfaces, retrofit of existing tunnels and long-term asset performance.
- Promote harmonisation across national and regional guidelines without replacing jurisdictional legal requirements, thereby reducing duplication of effort and lowering barriers for cross-border engineering practice.
- Support lifecycle- and performance-based tunnel design while coordinating with relevant ISO, IEC, CEN and professional bodies on adjacent subjects that remain outside the scope of the proposed TC.

Establishing this new field of technical activity will benefit countries with major tunnelling programmes - including China, Japan, Germany, South Korea, Austria, the United Kingdom, the United States, India, Australia, Norway, Switzerland and Singapore - while supporting equitable access to consistent standards for developing markets. It will also support high-reliability and climate-resilient underground infrastructure.

PROPOSED INITIAL PROGRAMME OF WORK (Please use the field immediately below or attach an annex)

Please see the ISO/IEC Directives, Part 1, Annex C.4.4 and C-4.5)

For each item, the initial work programme shall define the deliverable type and target dates. The initial work programme shall also assign priorities to the different items.

Please see attached annex. The annex should be read subject to the clarified scope and exclusions above. In particular, any content on operations, monitoring, digitalisation and sustainability is limited to tunnel-specific monitoring, assessment, resilience and asset-performance design interfaces, and excludes tunnel lighting design, traffic operations, ventilation/fans, environmental management, carbon/sustainability assessment methods, and general BIM/digital information management standards already covered by other committees.

RELATION OF THE PROPOSAL TO EXISTING INERNATIONAL STANDARDS AND ON-GOING STANDARDIZATION WORK

☒ The proposer has checked whether the proposed scope of the new committee overlaps with the scope of any existing ISO or IEC committee or JTC1 sub-committee

☒ If an overlap or the potential for overlap is identified, the affected committee has been informed and an agreement has been reached between proposer and committee on
   i. modification/restriction of the scope of the proposal to avoid overlapping,
   ii. potential modification/restriction of the scope of the existing committee to avoid overlapping.

☐ If agreement with the existing committee has not been reached, please explain why the proposal should be approved.

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☐ Have proposals on this subject been submitted into an existing committee and rejected? If so, what were the reasons for rejection?

N/A

LISTING OF RELEVANT DOCUMENTS (SUCH AS STANDARDS AND REGULATIONS) AT INTERNATIONAL, REGIONAL AND NATIONAL LEVEL

(Please see the ISO/IEC Directives, Part 1, Annex C, Clause C.4.6)

International Standards and Guidelines (Global)

- PIARC Road Tunnels Manual – Comprehensive international reference covering tunnel operation, safety, ventilation, and risk analysis.
- PIARC Working Group Reports – Digitalisation, fire risk, operations, ventilation, and safety assessment.
- ITA-AITES Guidelines – Global tunnelling association guidelines, including sprayed concrete linings, segmental lining design, life-cycle sustainability, and monitoring.
- ITAtech Publications – Machinery-specific guidance (e.g., TBM design considerations, fibre-reinforced linings).
- NFPA 502:2023 – Road tunnel, bridge, and limited-access highway fire protection (used internationally).
- FHWA Tunnel Design Guidelines (USA) – Highway tunnel design and geotechnical guidance.
- AASHTO publications (relevant parallels) – While not tunnel-specific, provide useful structural models applicable to underground works.
- NFPA 130 – Fixed Guideway Transit and Passenger Rail Systems
- ISO 19650 series – Organization and digitization of information about buildings and civil engineering works, including BIM (reference for information management interfaces only; general BIM standardisation remains outside the proposed TC).
- ISO 21928-2:2023 and ISO 21931-2:2019 – Sustainability indicators and assessment framework for civil engineering works (reference only where lifecycle design interfaces arise; sustainability assessment methods remain outside the proposed TC).

Regional Standards and Guidelines (Europe)

- Eurocodes (EN 1990–1999) – Basis of design, actions, concrete, steel, geotechnical, seismic design; widely referenced for tunnel design though non-tunnel-specific.
- JRC (Joint Research Centre) Reports – Interpretation of Eurocodes for tunnels; identifies gaps and recommended approaches.
- CEN/TC 250 Tunnel Annex (in development) – Emerging European harmonisation for tunnel-specific design elements.
- DAUB Recommendations (Germany) – Influential tunnelling design guidance, covering sprayed concrete, segmental linings, ground–structure interaction.
- RABT (Germany) – Road tunnel fire and safety requirements.
- BS 6164:2019 (UK) – Health and safety in tunnelling, including design and construction considerations.
- UK BD 78/99 – Design of road tunnels; relevant as a national reference for road tunnel design practice.
- CEN/TR 14380:2024 – Lighting applications - Tunnel lighting (reference only; tunnel lighting remains outside the proposed TC scope and should be coordinated with ISO/TC 274 and relevant CEN work).
- EN 45545 - Fire protection on railway vehicles
- UIC (Union Internationale des Chemins de fer) IRS 70779-9 – Safety in railway tunnels

National Standards & Codes (Asia-Pacific, Americas, Europe)

Japan:

- Japanese Road Association Tunnel Standard – Comprehensive requirements for tunnel structural design, waterproofing, seismic performance.
- MLIT Guidelines – Lifecycle performance, asset management, maintenance.

China:

- Chinese highway and railway tunnel standards, including JTG/T tunnel engineering technical standards – widely used for large-scale road, rail and urban tunnel projects, including projects in complex geology.

South Korea:

- Korean Road Tunnel Standards – Soft ground and mountain tunnelling design guidance.

India:

- MoRTH Tunnel Guidelines – Increasingly important given rapid tunnel infrastructure growth.

United States:

- NFPA 502 – (included above) global fire reference.
- FHWA Highway Tunnel Manual – Design, geotechnical parameters, ventilation, and safety.
- FHWA DCRT-1-2010 – Technical Manual for Design and Construction of Road Tunnels - Civil Elements.

Australian Standards & References

- AS 1726:2017 Geotechnical site investigations.
- AS 2870–2011 Ground reinforcement and soil classification references.
- AS 3600:2018 – Concrete structures.
- AS 3850.3:2021 Prefabricated concrete elements (relevant for segmental linings).
- AS 4100:2020 Steel structures.
- AS 4825–2011 Tunnel Fire Safety.
- AS 5100 series (2017–2020) – Bridge design; provides a modular model applicable to tunnel frameworks.

- AS 1170.2 & AS 1170.4 Seismic actions.
- Austroads Guide to Road Tunnels (AGRT) – National reference for tunnel operational and design consistency.
- Austroads road design, ITS, lighting standards – Relevant to operational aspects.
- South Australia Master Specification – Part 265 “Tunnelling” – Design/construct criteria for ground treatment, linings, waterproofing, monitoring.
- VicRoads / DoT Victoria Tunnel Requirements – Used in major projects (Metro Tunnel, North East Link).
- Transport for NSW / Sydney Metro Tunnel Design Criteria – Comprehensive project requirements that highlight gaps in national standards.
- Queensland TMR Road Planning and Design Manual – Includes tunnel guidance aligned with Austroads.
- Australian Tunnelling Society (ATS) Design Guidelines, 2nd Edition (2023) – Key practitioner reference across major projects.
- Society of Fire Safety (SFS) Tunnel Fire Safety Guidance.
- Engineers Australia Position Papers – Sustainability, digital engineering, and lifecycle design.
- AS/NZS IEC 60825 Safety of Laser Products
- AS/NZS IEC 62471 series Photobiological safety of lamps and lamp systems

Industry and Professional Guidance

- CIRIA C760:2017 – Guidance on embedded retaining wall design (used in mined and cut-and-cover tunnels).
- ITAtech Guidelines – Segmental linings, fibre reinforcement, monitoring systems.
- International Tunnelling Association (ITA) Reports – Sustainability, digital twins, carbon assessment.
- Manufacturer specifications for TBMs, roadheaders and associated equipment – contextual references for construction interfaces only; machinery and equipment design are outside the proposed TC scope.

Regulatory Documents & Operational Frameworks

- NFPA 502 (USA) – (duplicate removed; already listed but note it also functions as regulatory for many regions).
- EU Fire & Safety Directives for tunnels (various member-state implementations).
- Transport authority tunnel criteria (TfNSW, Vic DoT, LA Metro, Singapore LTA, Hong Kong HyD) – Project specifications widely adopted in major projects.
- European railway tunnel requirements, including Regulation (EU) No. 1303/2014, TSI SRT and TSI INF – reference only for boundary management with railway-specific requirements outside the proposed TC scope.

WHS/OHS Regulations

- National model Work Health and Safety Regulations (WHS)
- State and Territory WHS/OHS regulations
    - For example: Victorian Occupational Health and Safety Regulations 2017 which includes:
        - Part 3.1 Hazardous Manual Handling
        - Part 3.2 Noise
        - Part 3.3 Prevention of Falls
        - Part 3.4 Confined Spaces

- Part 3.5 Plant
- Part 3.6 High risk work
- Part 4 Hazardous substances and materials
- Part 5.1 Construction
- Part 6 Licensing and registration

LISTING OF RELEVANT COUNTRIES WHERE THE SUBJECT OF THE PROPOSAL IS IMPORTANT TO THEIR NATIONAL COMMERCIAL INTERESTS
(Please see the ISO/IEC Directives, Part 1, Annex C, Clause C.4.8)

Austria, China, Germany, Japan, Netherlands, South Korea, UK, USA, Italy, India, Singapore, Norway, Switzerland, France, Spain and Hong Kong, China

LISTING OF RELEVANT EXTERNAL INTERNATIONAL ORGANIZATIONS OR INTERNAL PARTIES (OTHER THAN ISO AND/OR IEC COMMITTEES) TO BE ENGAGED AS LIASONS IN THIS WORK
(Please see the ISO/IEC Directives, Part 1, Clause C.4.9)

PIARC, ITA-AITES, CEN/TC 250, CEN/TC 189 and, where appropriate, CEN/TC 169 and CEN/TC 256. Internal ISO/IEC liaison should be established or maintained with relevant committees including ISO/TC 71, ISO/TC 221, ISO/TC 113/SC 8, ISO/TC 146/SC 3, ISO/TC 117, ISO/TC 269/SC 1, ISO/TC 274, ISO/TC 59/SC 13, ISO/TC 59/SC 17, ISO/TC 241, ISO/TC 92 and relevant IEC committees, as required by the work programme.

IDENTIFICATION AND DESCRIPTION OF RELEVANT AFFECTED STAKEHOLDER CATEGORIES
(Please see ISO Connect)

	Benefits/Impacts/Examples
Industry and commerce – large industry	• Major engineering consultancies, constructors, and operators gain clearer design requirements, reducing project risk and contractual ambiguity. • Improves consistency across multi-billion-dollar road and rail tunnel projects. • Supports consistent exchange of design and asset information while relying on existing digital engineering and BIM standards.
Industry and commerce – SMEs	• Provides clear, accessible guidance that reduces barriers to participation for smaller contractors and suppliers. • Enhances competitiveness by reducing reliance on disparate international standards. • Supports SMEs working in niche areas associated with tunnel design, construction, assessment, and monitoring through more consistent international benchmarks.
Government	• Supports consistent regulation across states and territories, reducing duplication and interpretive discrepancies. • Improves safety, resilience, and climate-adaptation outcomes for government-owned infrastructure. • Facilitates transparent procurement and reduces lifecycle maintenance costs.

Consumers	• Enhances public safety through harmonised design criteria. • Improves long-term reliability of critical transport infrastructure. • Supports reliable, durable, and sustainable infrastructure delivery.
Labour	• Provides clearer tunnel design interfaces that can inform construction planning, inspection and maintenance, while not replacing occupational health and safety requirements. • Reduces worksite risk by improving clarity of civil and structural design assumptions, monitoring interfaces and asset information relevant to tunnel works. • Improves training frameworks through standardised practices.
Academic and research bodies	• Enables research alignment with nationally recognised performance criteria. • Supports innovation in digital twins, resilience modelling, monitoring interpretation, ground behaviour and lifecycle performance. • Facilitates collaboration between universities, industry, and government.
Standards application businesses	• Offers a coherent reference for certification, compliance verification, and auditing. • Reduces uncertainty in applying mixed international standards to Australian projects. • Creates demand for new certification pathways and conformity assessment services.
Non-governmental organizations	• Allows public-interest and safety advocacy groups to better understand how durability, resilience and lifecycle performance are addressed in tunnel design. • Recognises sustainability-related interfaces while relying on existing standards for environmental management and sustainability assessment.

Environmental stakeholders	• Clarifies how durability, resilience and lifecycle performance may contribute to long-term environmental performance of tunnel assets • Supports coordination with existing sustainability and environmental management standards where design interfaces arise • Does not create a new environmental management, impact assessment or carbon assessment standard • Encourages consideration of low-carbon design interfaces without duplicating product, material or assessment standards • Maintains clear boundaries with committees responsible for environmental and sustainability assessment
Other (please specify)	• Gains long-term clarity on inspection, condition assessment, retrofit, and resilience requirements. • Supports integration of monitoring technology, digital twins, and lifecycle maintenance plans.

EXPRESSION OF LEADERSHIP COMMITMENT FROM THE PROPOSER

(Please see the ISO/IEC Directives, Part 1, Annex C, Clause C.4.12)

As the proposing organisation, we commit to providing the leadership, technical direction, and sustained engagement necessary for the successful development of this new work item. We will allocate qualified experts, coordinate national input, and actively participate in drafting, reviewing, and consensus-building activities throughout the project.

We further commit to supporting effective liaison with relevant ISO committees, IEC committees, CEN committees, international partners, and stakeholder groups to ensure that the work reflects global best practice and remains clearly bounded against existing standards. Our leadership will ensure that the project is delivered in accordance with ISO procedures, timelines, and quality expectations.

☒ **The proposer confirms that this proposal has been drafted in compliance with iso/iec directives, part 1, annex c**

SIGNATURE OF THE PROPOSER

Standards Australia

COMMENTS OF THE ISO CENTRAL OFFICE (IF ANY)

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