

TECHNICAL COMMITTEE 3.3 – ASSET MANAGEMENT

3.3.1. Innovative approaches for asset management systems

Strategies / Objectives

- Develop a guideline for implementing Asset Management Systems in the road sector according to ISO 55001, taking in account different road organizations and at different maturity levels. The WG will consider also other approaches and different level of maturity in the case studies.
- Incorporation of life-cycle management and risk approach.
- Improve and innovate managing assets approach by taking into consideration of a triple bottom line of sustainability (PPP, i.e. profit, people, planet).
- Investigate the use of BIM (Building Information Model), by using a standard format, in conjunction with current AMSs used by road owners and operators.
- Investigate the use of Digitalization in Asset Management.
- Take into account works carried out by *T.C.D.1 – Asset Management* within Cycle 2016-2019.
- Encourage coordination with other TCs and TFs, such as *T.C. 1.1 – Performance of Transport Administrations, T.C.1.2 – Planning Road Infrastructure and Transport to Economic and Social Development, T.C. 1.3. Finance and Procurement, T.F. 1.2 – HDM-4, T.C.2.4 – Road Network Operation/ITS, T.C. 4.1 – Pavements, T.C. 4.2 – Bridges, T.C. 4.3 – Earthworks and T.C. 4.4 – Tunnels, T.F.3.1 – Road Infrastructure and Transport Security, T.F.2.2 – Electric Road Systems, and T.F.4.1 – Road Design Standards.*

Asset management coordinates financial, operational, maintenance, risk and other activities related to an organization's assets in order to obtain more value from them.

ISO 55001 defines the requirements for an asset management system. This management system provides a framework for establishing asset management policies, objectives and processes, and enables an organization to achieve its strategic goals. It uses a structured, effective and efficient process that leads to continuous improvement and increased asset value.

Developing, implementing and integrating an asset management framework based on ISO 55001 ensures that the organization manages its performance, risks and costs very effectively and efficiently. For this reason, the TC will develop a guideline for implementing Asset Management Systems in the road sector, according to ISO 55001, taking in account that there are different road organizations and networks with different levels of maturity.

All of this considering the life-cycle management and the risk management approaches.

In addition, during the last decade, the BIM methodology has been progressively implemented in different countries, being for some of them a priority objective of their Public Administrations, which have imposed or valued its use in public works.

Building Information Modeling (BIM) is a collaborative work methodology for the creation and management of a construction project. Its objective is to centralize all the information of the project in a digital information model created by all its agents. BIM represents the evolution of traditional design systems based on the plane, as it incorporates geometric (3D), time (4D), cost (5D), environmental (6D) and maintenance (7D) information.

Since the use of BIM goes beyond the design phases, encompassing the execution of the project and extending throughout the life cycle of the asset, allowing the management of the asset and reducing operating costs, research into its application to the road sector is a current need.

The same goes for digitization, an innovative process that has arrived with great force and whose application to the asset management sector must be investigated. Especially topics like Big Data, Smart Data, AR/VR, and AI, can be mentioned here.

In this Cycle, the guideline before mentioned and a briefing note based on the collection of case studies is expected to be completed.

Outputs	Expected Deadlines
<ul style="list-style-type: none"> Collection of case studies 	<ul style="list-style-type: none"> June 2021
<ul style="list-style-type: none"> Briefing note on life-cycle management and risk management 	<ul style="list-style-type: none"> April 2022
<ul style="list-style-type: none"> Briefing note on BIM and digitalization 	<ul style="list-style-type: none"> July 2022
<ul style="list-style-type: none"> Guideline for Asset Management Systems 	<ul style="list-style-type: none"> December 2022

3.3.2. Measures for improving resilience of road network

Strategies / Objectives
<ul style="list-style-type: none"> Identify and quantify the risks and global losses associated to damages of transportation system and to establish efficient risk mitigation strategies within a holistic approach on road infrastructure. Overview of existing PIARC reports on this matter. Identify best practices and approaches of Road Asset Management measures to improve the resilience of the road infrastructure. Encourage coordination with other TCs and TFs, such as <i>T.C. 1.1 – Performance of Transport Administrations, T.C.1.2 – Planning Road Infrastructure and Transport to Economic and Social Development, T.C. 1.4 – Climate change and resilience of road networks, T.C. 1.5 - Disaster Management, T.F. 1.2 – HDM-4, T.C.2.4 – Road Network Operation/ITS, T.C.4.1 – Pavements, T.C.4.2 – Bridges, T.C.4.3 – Earthworks and T.C.4.4 – Tunnels, T.F.3.1 – Road Infrastructure and Transport Security, T.F.2.2 – Electric Road Systems, and T.F.4.1 – Road Design Standards.</i>

In the context of the Financial/Economic aspects of resilience, it is acknowledged that the road network is a fundamental component to the effective running of the economy. Where disruptions occur due to a range of hazards, the network is as a result compromised, and this leads to serious loss in financial and economic costs to agencies, road operators and transport users. Resilience is therefore of high importance to ensure that road user costs and socio-economic costs are reduced. In principle, when considering economic aspects within the framework of resilience management, the measurement of vulnerable road infrastructure and adaption options should be considered.

Road Administrations are responsible for the management of road networks, which are an important asset for a country. Efficient asset management requires preparing the infrastructure to cope with the various risks that can damage it. The approach to increasing the resilience of road networks must be holistic, to consider all possible risks and the interactions between them, and to determine what may be the most appropriate and cost-effective adaptation procedure.

In this Cycle, a full report summarizing measures to improve resilience of road networks is expected to be completed. Prior thereto, it would be interesting to carry out interviews and case studies on this matter.

Outputs	Expected Deadlines
<ul style="list-style-type: none"> Interviews and case studies 	<ul style="list-style-type: none"> December 2021
<ul style="list-style-type: none"> Full report 	<ul style="list-style-type: none"> December 2022

3.3.3. Renewal and rejuvenation of aging infrastructure

Strategies / Objectives

- Identify best practices and approaches of road asset management that support the renewal and modernization of aging road infrastructure, including the management of road renewal backlogs.
- Take in account the emerging vehicle and infrastructure technologies.
- Build on the findings of *T.C.D.1 – Asset Management* within Cycle 2016-2019.
- Encourage coordination with other TCs and TFs, such as *T.C. 1.1 – Performance of Transport Administrations*, *T.C.1.2 – Planning Road Infrastructure and Transport to Economic and Social Development*, *T.C. 1.3. Finance and Procurement*, *T.C.2.4 – Road Network Operation/ITS*, *T.F.2.1 – New mobility and its impact on Road Infrastructure and Transport*, *T.F.B.2 – Automated vehicles*, *T.F.3.1 – Road Infrastructure and Transport Security*, *T.C. 4.1 - Pavements*, *T.C. 4.2 - Bridges*, *T.C. 4.3 - Earthworks*, *T.C. 4.4 – Tunnels*, *T.F.4.1 Road Design Standards*, *T.F.2.2 – Electric Road Systems*.

Several elements of the road networks are reaching the end of their working lives. Some of them are easy to reinforce or to replace, but others face more challenges. This is the case of structures, many of them around the world now are reaching a point where significant structural or material repair is needed.

Challenges are various. Changing needs place stresses on infrastructure that may not have been considered when they were first designed and built. For example, the weight and quantity of commercial vehicles in use have increased significantly. Bridges designed for traffic 40 years ago are now coping with very different loads; one reason why unforeseen use is one of the main causes of bridge failure.

Similarly, assets that were built to comply with less stringent safety standards than we expect today continue to play a fundamental role in our daily lives. Bringing those assets up to date carries inherent risks – both during maintenance and upgrade works and also during the remaining life of the asset.

How can Road Administrations evaluate the risks and prioritize strategies for rehabilitation, repair or replacement? These asset owners work closely with research and academic institutes to ensure scientific methods and cutting-edge knowledge is applied in order to measure the state of their infrastructure, since the core question is in the evaluation. It might struggle to calculate the remaining life of an existing structure. Most engineering programs focus predominantly on design, but now we are realizing that upskilling is required for those who are interested in age care of existing structures.

And finally, the huge challenge of finding the funds for evaluate, repair or replace the ageing road elements. At least, they must be carefully monitored and maintained regularly.

Ageing infrastructure is a global issue with potentially harmful consequences. Innovative approaches are required to address this main issue.

In this Cycle, a full report is expected to be completed, based on the literature review, interviews and case studies carried out in advance.

Outputs	Expected Deadlines
• Literature Review	• December 2020
• Interviews and case studies	• December 2021
• Full report	• December 2022

3.3.4. Update of the Asset Management

Strategies / Objectives

- Upgrade the content of the Road Asset Management Manual by:
 - Increasing the number of cases studies in order to cover all levels.
 - Introduction of the following topics:
 - Cross asset investment prioritization and optimization
 - Incorporation of life-cycle cost analysis “LCCA” into asset management process
 - Initiatives to integrate resilience management of risks posed by natural hazards into asset management of road networks
 - Innovation elements to integrate BIM and database of management system
- Extend the education and dissemination section of the Road Asset Management Manual by:
 - Enhancement of existing training material
 - Adding further training material for:
 - Various target audiences
 - Different maturity levels
- Take into account works carried out by *T.C.D.I – Asset Management* within Cycle 2016-2019.

During the 2012-2015 cycle, a Web-based electronic Road Asset Management Manual was designed and developed building on the work of the previous cycles and integrating the outputs of that cycle. The *T.C. D.I “Asset Management”* (cycle 2016-2019) upgraded it by including case studies and practical examples.

The Road Asset Management Manual will be updated during this cycle by incorporating innovative approaches useful for Road Administration and by increasing the case studies. Make the education section available on the web and propose new sections will be, both, objectives for this cycle.

Special effort will be made to increase dissemination and training.

Outputs	Expected Deadlines
• New proposed sections	• December 2020
• Make the education section available on the web	• June 2021
• Additional case studies	• December 2022
• Update of the Road Asset Management Manual	• June 2023