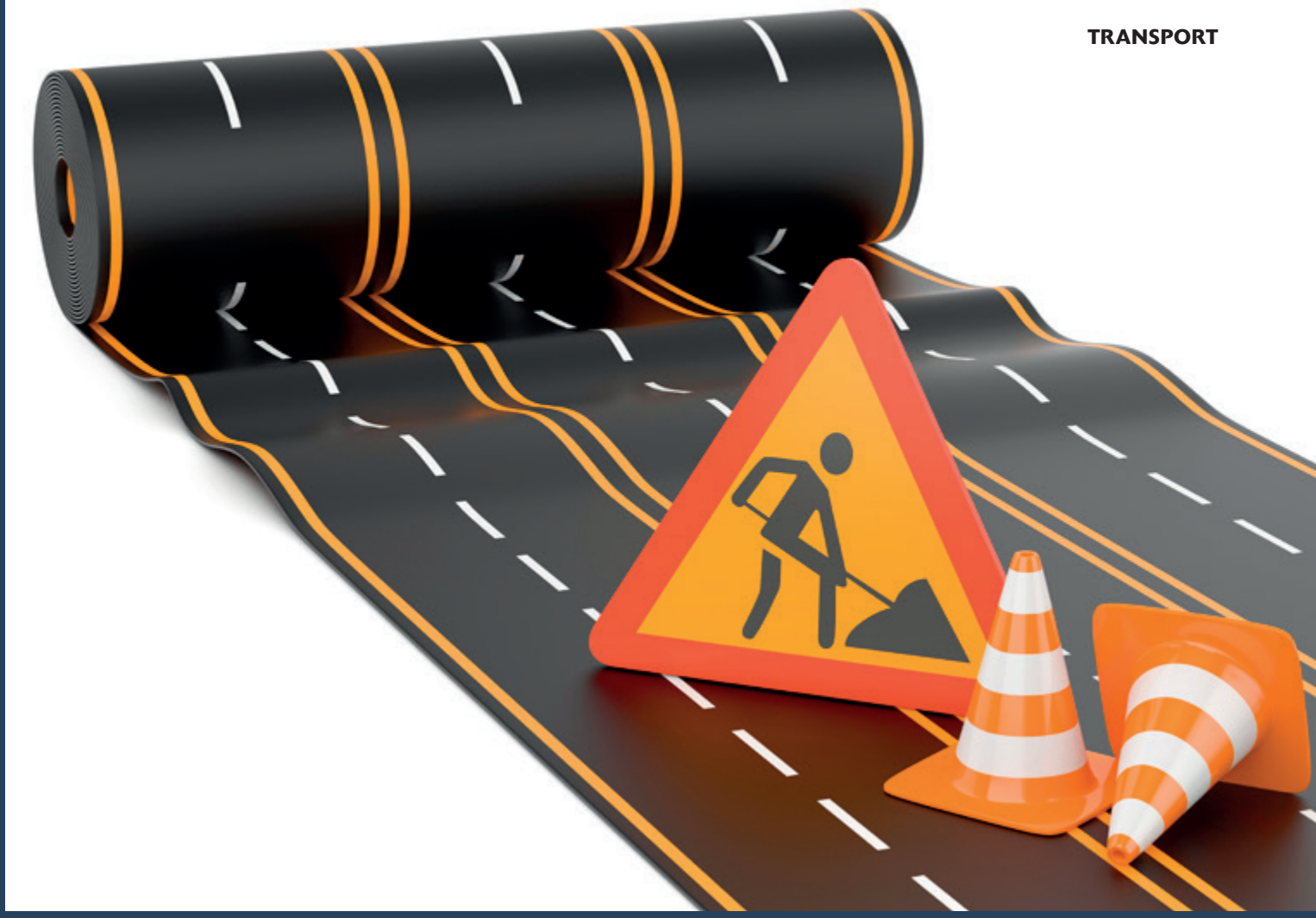

THE TRANSPORT GAME-CHANGER

WHOLE-LIFE ASSET MANAGEMENT IS INCREASINGLY IMPORTANT FOR CASH-STRAPPED HIGHWAY AGENCIES AROUND THE WORLD. HOWEVER, WITHOUT PROPER SYSTEMS INTEGRATION, THEY COULD BE SWAMPED IN A DELUGE OF DATA AND NEVER ACHIEVE THEIR AIMS, WRITES JAMES BROWN

For transport engineers and planners, asset management is fundamental. With more and more roadway projects tied to performance-based programmes, managing roadway assets in compliance with government mandates has never been more important. Advances in enterprise asset data management are making compliance easier. At the same time, they're also reshaping how transport organisations plan and prioritise infrastructure asset maintenance and renewals – and, ultimately, how they leverage data to make better business decisions about their roadway network.

Highway agencies are under constant pressure to direct limited resources where they will deliver the most benefit, whether that's achieving service level targets or investing in capital projects. That means balancing groups of factors that are commonly in tension: economic, operational, environmental, social and political. To overcome these issues and challenges, many engineers and planners are turning to sophisticated asset management techniques.

For decades, highway agencies focused on regular preventative maintenance and prioritisation based on the conditions of assets. But that focus is shifting. Over the past few years, engineers have started implementing whole-life models for multiple types of assets. Models, such as PAS 55 and ISO 55001, aim to sustainably fulfil all performance measures (reliability, cost, safety, availability and revenue) at the lowest cost (capital, operating, maintenance and renewal) over an asset's lifetime.

Central to this approach is the need to collectively assess datasets from a broad range of operational functions, asset types, business systems and databases. The upside to leveraging such a broad pool of data is that it places greater emphasis on evidence-based decision-making to inform operations, optimising the balance between maintenance and renewals. The downside is the source records are typically spread across disparate and unconnected systems.

For engineers and planners, the challenge has become less about identifying and collecting more asset data to feed whole-life models, and more about adopting information and communication technology solutions that will integrate existing asset data with other enterprise management systems, enabling faster and more accurate analysis and reporting.

Bringing disparate asset data together

Big data is creating a big challenge for engineers and planners: data integration. In a whole-life asset management model, multiple data types need to be correlated from different business systems and databases across the enterprise. Often, these will not have been designed to integrate with other enterprise systems and may use quite different referencing models.

That's a huge hurdle for highways engineers. To truly analyse performance, engineers and planners need an efficient method to integrate asset data with operational and financial data from their existing enterprise management systems.

However, once it's achieved (see box), with asset data connected to other enterprise management systems, they can streamline their workflows in design, cost estimation, construction and maintenance timelines, asset performance analysis, and reporting. Data integration is critical to helping engineers and planners build a foundation for evidence-based strategies for asset maintenance and renewals.

Turning enterprise asset data into action

Once all the data is collated, correlated and talking to each other, what's next? The next step is to combine all that infrastructure asset data with operational and financial data for analytics, reporting, and a better strategy for maintenance and renewals.

For highway engineers, analytics and dashboards provide greater insight into patterns and variations in asset condition and performance. For example, engineers and planners can track and assess normal wear-and-tear of assets, environmental degradation and risk to assets, and frequency of incidents. Then, they are able to triangulate these datasets with annual budgets, workforce allotment and other maintenance or renewal projects already in progress. Analytics and dashboards help engineers sort through the data noise to address the issues that need the most attention.

Today, there's a fine balance between maintenance versus renewals for highway agencies. Previously, when engineers focused on regular preventative maintenance and prioritisation based on the condition of assets, the decisions to maintaining or renewing assets were more cut and dry. However, those decisions might not have been optimal for increasing or sustaining asset performance at the lowest cost possible from a long-term perspective. For example, it can work out cheaper to reengineer a whole section of road to address an underlying issue than continually make repairs at an elevated frequency.

In a whole-life asset management model, making maintenance and renewal decisions is more complex. Multiple variables and datasets are used to identify where it's most cost effective to repair or replace infrastructure assets. The challenge for engineers is in analysing and interpreting the data to create strategies that will boost asset performance, maintain safety, and increase service quality for long-term benefits. And that challenge is compounded if they don't have adequate information and communications technology to bring data together.

A tipping point?

Transport engineers will continue to develop and implement whole-life asset management techniques, just as other industries are following suit, from rail to electricity distribution. But have we reached a data integration tipping point, where infrastructure assets converge with enterprise management systems? That's a tough call to make.

But based on our experience with transport organisations, they clearly need and want to rethink how they plan and prioritise maintenance and renewals. Proactive agencies are already implementing whole-life models for asset management and leveraging technologies to direct limited resources where they will deliver the most benefit.

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