

Creating a Safety-Oriented Culture via Ansys Digital Safety Manager

As automobiles have become more digitized and increasingly complex in terms of their features, the responsibilities of safety teams have grown exponentially. After automakers and their suppliers work to engineer dozens of critical systems and components — like braking systems, steering systems or ADAS — safety teams must identify and address every potential failure mode or malfunction that can lead to a hazard, at both the component and system levels. Ansys medini analyze is a proven solution for conducting the rigorous analysis required to accomplish this task. But many organizations need more than a tool for safety analysis — they need an over-arching solution to help coordinate and manage the end-to-end safety process, from people to processes. Ansys Digital Safety Manager is designed to address this need. By creating a central hub for every piece of data related to safety, then using that information to automate analysis and help construct the safety case, Ansys Digital Safety Manager creates a culture focused on safety. The benefits include greater visibility and transparency, higher levels of productivity, enhanced collaboration and less rework, leading to significant savings in both time and costs.

The world's automotive engineering teams have typically viewed safety analysis as an execution-based activity. As dozens of electronic components and systems are aggregated in a vehicle design, safety teams conduct modeling and analysis to ensure they will perform reliably under every potential driving scenario. For years, Ansys medini analyze has been the industry standard for supporting these efforts, delivering significant time and cost benefits. Today, Ansys Digital Safety Manager is amplifying these benefits by optimizing safety management at the next level. Instead of just focusing on individual projects, Ansys Digital Safety Manager optimizes all safety efforts across the organization, ensuring that best practices and the right resources are applied every day, on every project. By acting as a centralized solution for gathering data, managing resources, and planning and automating many process steps, Ansys Digital Safety Manager creates an organizational focus on safety. Not only do engineering teams save time and money, but they operate with an increased commitment to safety as a business priority.

/ Safety Culture: Building a Safety-Focused Organization

As cars become more digital in nature, they deliver enormous benefits to drivers and passengers, including increased autonomy, efficiency, comfort and navigation ease. However, these benefits are accompanied by an increasing number of potential risks. Automakers are challenged to bring together dozens of electronic components and systems, engineered by multiple internal teams and external suppliers, in a safe manner. Every component must work reliably under every possible driving condition. Equally challenging, the entire system must work together reliably and flawlessly once all components have been integrated.

Modeling and analyzing all components, systems and triggered vehicle behaviors with respect to their potential impact on safety is the job of the functional safety (FuSa) team, as well as the safety of the intended functionality (SOTIF) team. FuSa experts assess the entire system architecture and identify every potential failure mode, the likelihood of resulting failures and the response of the integrated system to these failures. SOTIF experts look not at system failures, but at whether the needed safe functionality is successfully delivered in the absence of a failure. For example, can sensors identify objects correctly and trigger an appropriate response? Is their performance up to the real-world safety task? This thorough safety analysis helps ensure that the integrated components that make up modern cars will not create any unreasonable risk under a range of actual driving conditions.

The world's leading automotive engineering teams rely on Ansys medini analyze to conduct both FuSa and SOTIF analyses. Medini analyze is an intuitive, easy-to-use modeling and analysis tool that ensures the entire electronics architecture — with its many components, connections and interfaces — responds safely and appropriately under thousands of real-world scenarios. This proven solution has helped automakers deliver innovative designs, reduce market launch times, maximize revenues and profits, and comply with regulatory standards such as ISO 26262 (FuSa) and ISO 21448 (SOTIF).

While medini analyze is a trusted execution-level tool, many automotive engineering organizations are still struggling to manage the complexity of the overall safety process – from making a safety plan and delivering the required work products to defining the safety case. From suppliers and internal team members to process flows and analysis data, the safety process has many stakeholders and activities that must be managed carefully to meet deadlines. As individual projects and their associated deadlines take precedence, it can be difficult to take a high-level view of the entire safety process – including delivering successful outcomes and mature work products, across all projects – and ensure it is working optimally to generate the final safety case.

Managing this complex process more effectively helps automakers move beyond successful execution of individual projects. They can build a culture and an organization focused on safety, designed to deliver analysis results and launch new vehicles faster, more productively and more profitably than ever before.

/ Ansys Digital Safety Manager: Driving Safety Process Optimization

Recognizing the need for high-level safety management, Ansys has developed a powerful new solution for mastering the complexities of this process. Ansys Digital Safety Manager enables the safety management process, providing a bird's-eye view that supports end-to-end process optimization.

While many automotive engineering teams are using spreadsheets and other consumer tools to manage all the complexities of safety planning, work-product collection, progress monitoring and other required activities, Ansys Digital Safety Manager is a purpose-built solution that was designed specifically for these tasks.

Ansys Digital Safety Manager recognizes and reflects the way safety teams work every day, not only internally but with their suppliers, assessors and reviewers. It accommodates differences among engineering teams, but also provides a universal framework for ensuring that all safety work is accomplished in the most efficient, productive and cost-effective manner possible.

As a result, automakers and suppliers can meet their launch deadlines and financial goals, with a high degree of confidence that their innovative vehicle designs will perform safely and reliably on the road.

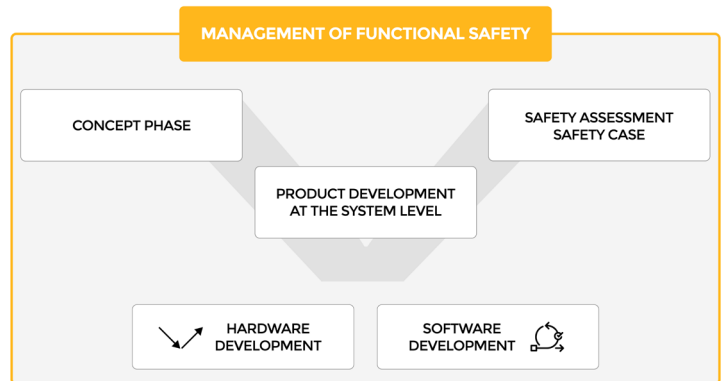
Equally important, Ansys Digital Safety Manager creates an organizational culture that values and prioritizes safety. By giving dedicated team members real-time visibility into the safety process – not just on a project basis, but across all projects – this solution encourages collaboration and accountability.

Instead of viewing safety as an execution-based activity, team members can see its strategic importance and recognize their own contributions to the larger effort of delivering safe automotive designs to consumers.

/ Managing the End-to-End Safety Process

How exactly does Ansys Digital Safety Manager work? First, it provides a bird's-eye view of all the organization's activities and data related to safety, including:

- **All data from ongoing and existing safety analyses.** One of the most important benefits of Ansys Digital Safety Manager is its ability to gather all safety analysis results and arguments in one centralized location – making them re-usable, so there is no need to start new analyses from scratch. Few organizations have been able to master this challenge historically, making it a huge competitive advantage.
- **Internal team members' experience and capabilities,** including qualifications, training, skill sets, technology expertise and other relevant information. This ensures that the right people are assigned to the right safety tasks, optimizing productivity and the overall quality of safety analysis.
- **External suppliers' capabilities** and historical safety analysis results. This allows the safety team to ensure that suppliers have been selected and monitored with safety in mind, and that any applicable analysis tasks are being shared in the best manner.
- **Technology tools and resources** devoted to safety. Engineering teams can make sure they are applying best-in-class solutions and have eliminated redundancy.



This figure shows ISO 26262, as an example. Ansys Digital Safety Manager is an overarching solution that sits atop the many tasks and tools involved in safety. It orchestrates and manages these elements, optimizing the end-to-end process.

ROLE	NAME	EDUCATION	PROJECT EXPERIENCE	COURSES
Project Safety Manager	Anthony Adams	M.Sc. Electrical Engineering	8 years, 4 projects	Safety Basic Training Certified Project Manager
SW Architect	Bernard Bower	PhD. Computer Sciences	3 years, 2 projects	Safety Introduction Course Certified SW Architect
System Tester (HIL)	Charly Chaplin	Bachelor Electrical Engineering	2 years, 2 projects	Certified Tester

Ansys Digital Safety Manager provides a single, centralized location for gathering and tracking all safety data, such as team members' credentials and training.

- **Analysis workflows and processes**, such as fault trees and other hazard and risk analysis methods. This solution guarantees that the entire team is conducting safety analysis in the same manner, using the same modeling processes and tools. Team members can share and adopt best practices that take the whole team's performance to a higher level.

Based on this collected information, Ansys Digital Safety Manager is then able to automate the management of any new project. For example, it might distribute tasks to certain suppliers, technology tools or employees based on their capabilities and their contributions to similar projects in the past. To make sure projects remain on track, this solution also gathers metrics related to key performance indicators (KPIs) and sends alerts when efforts are running late, over budget or otherwise outside predefined performance parameters.

By pulling relevant data from different departments and from supplier organizations, Ansys Digital Safety Manager streamlines, accelerates and improves the accuracy of all safety activities. For the first time, engineering teams have a single perspective on safety – beyond the individual project level – that is kept up to date in real time.

Because Ansys has designed Digital Safety Manager for this specific purpose, it typically replaces multiple point tools that have been used to manage the safety process in the past, for lower costs and reduced administrative complexity.

/ Maximizing Efficiency and Minimizing Rework

Nearly all new car designs represent an iterative improvement over older models. There may be exciting new features and functionality, but the truth is that much of the vehicle design remains the same when a new car model is introduced. In fact, only a small part of the overall engineering content may be new and specific to that design. It simply does not make sense to completely re-do the safety analysis process for this new model, when up to 95% of this effort may be redundant. While not doing new safety analysis, and instead relying on old results, is not an option, Ansys Digital Safety Manager can streamline and accelerate the new analysis tasks.

As engineering teams conduct hazard analysis and other safety studies for the new vehicle design, Ansys Digital Safety Manager supports the process of re-using and re-applying safety work products from other models that are still relevant and applicable. This is achieved by facilitating rich traceability through all safety artifacts, managing known meta information about the work products and evidence, and offering formal and informal argumentation and impact analysis to justify the re-use.

This solution is a game-changer in the degree to which it accelerates the safety process toward the final safety case, without sacrificing any rigor when it comes to safety analysis.

/ Realizing the Enormous Benefits of Standardization

Although ensuring safety is a critical competency, protecting both human lives and brand reputations, this capability is typically not optimized at a high level. Pressed for time and costs, engineering teams have historically focused on executing individual safety projects and getting specific vehicles to market quickly. The company culture is typically focused on achieving results on a project-by-project basis, instead of standardizing and optimizing the larger safety process.

Today, just as medini analyze has helped revolutionize safety analysis for the world's automotive teams, Ansys Digital Safety Manager is revolutionizing the overall management of safety-related activities – leading to a real cultural change. Automakers now have a new strategic capability to visualize and optimize all their safety work, so they can assure the right people, processes, tools and practices are being applied for every job, every day.

While Ansys Digital Safety Manager is initially being released to the global automotive industry, it will eventually help optimize safety activities for aerospace companies, defense agencies and other organizations seeking to master the challenge of consistently and profitably complying with regulatory guidelines for safety.

By creating standardized best practices, gathering and re-using data, and documenting all safety activities, Ansys Digital Safety Manager delivers enormous financial value. It gets new vehicle designs to market quickly, cost effectively and with a high degree of confidence, without sacrificing analytic rigor. This robust solution not only charts the path for success, but makes sure the entire organization gets there by creating a new organizational focus on safety.

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