
Beat the clock: Maximizing rail crew hours of service

The railway operator's guide to complying
with hours of service regulations and beyond

The real dangers of crew fatigue

What is the first thing that comes to mind when you think about railroad safety risks? Chances are, you're thinking about something technical such as excessive loads, aging locomotives, or speeding. But the real, and often overlooked danger, could be your overworked train drivers or crew.

The reality is that unpredictable work schedules, long hours, and continuous operations are the norm in the rail industry. While you may have internal measures to mitigate it, crew fatigue poses significant risks to operational safety, especially during peak service times. A recent study¹ by the Rail Safety and Standards Board in the UK identified fatigue as a factor in 21% of rail incidents, and that train drivers were most affected by work-related fatigue.

In fact, the Federal Railroad Administration (FRA) estimates that fatigue is a contributing factor in 25% of serious train accidents caused by human factors. This is why reducing employee fatigue has been one of the FRA's top initiatives to improve railway safety since the 1990s.

[1] Bowler, Gibson. 2015. "Fatigue and its contribution to railway incidents." Rail Safety and Standards Board. <http://www.rssb.co.uk/Library/risk-analysis-and-safety-reporting/2015-02-str-fatigue-contribution-to-railway-incidents.pdf>.





The tipping point

The tipping point for the FRA came in 2008 when it introduced the Rail Safety Improvement Act of 2008, which introduced some regulations to improve safety. Top among them are the Positive Train Control (PTC) system to ensure train and rail safety, and hours-of-service regulations to reduce the chance of human error caused by employee fatigue.

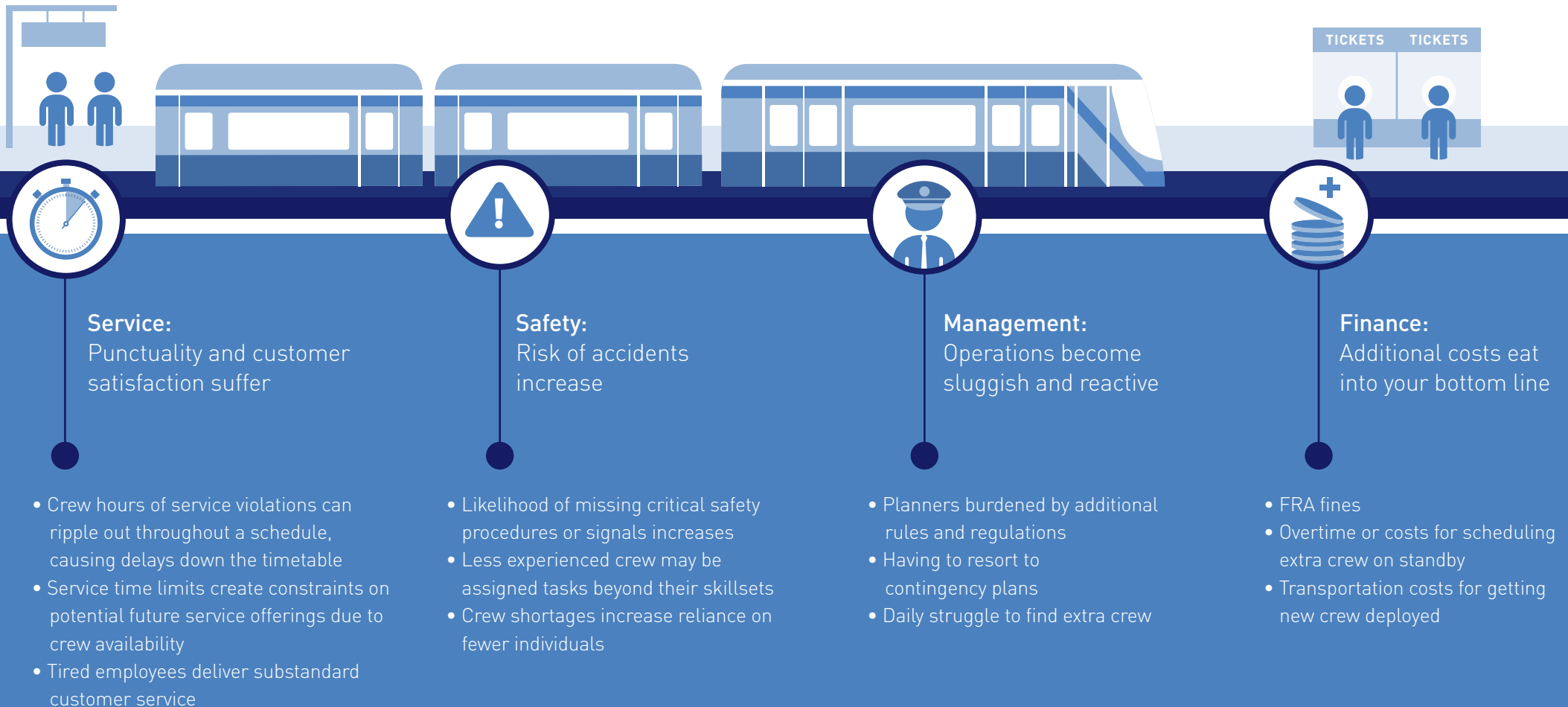
The hours-of-service regulations are extensive, with provisions for different roles and situations. At a basic level, it dictates that train operating crew and signalmen can work a maximum of 12 hours, with at least 10 hours of rest, or at least 8 hours of rest if they worked less than 12 hours. But this is only the tip of the iceberg.

What was already a complicated puzzle for railway schedulers is now made even more complex with dozens of new rules and requirements for every crew and staff member allocation. And it's taking a toll on railway companies in more ways than one. For example, operators face millions of dollars in fines each year for failing to comply with FRA regulations.

So how do fatigue management and FRA regulations affect your organization? Read on to find out.

The costs of fatigue management

Fatigue management goes far beyond complying with rules and regulations; it affects almost every aspect of your organization, including customer satisfaction, safety, and the bottom line. Let's take a closer look:





A new approach to optimal workforce management

Better crew fatigue management is only a small part of running a railway. To truly get ahead of the competition, railways have to go beyond preventing accidents and getting passengers from A to B. This requires a new approach to workforce management.

Step 1: More integration, fewer silos

The conventional way of planning in silos may have made sense when the scale of operations was smaller and the level of operational complexity lower. But this is no longer viable today. The demands of complying with FRA regulations far outstrip the capabilities of manual planning.

To achieve optimal efficiency, organizations need to replace their whiteboards and spreadsheets with an intelligent, integrated planning system. This system should provide planners with complete operational visibility to handle disruptions efficiently and ensure FRA regulations and company rules are automatically enforced at all times.

Step 2: Model your rules and regulations

The flexibility of the Quintiq integrated planning platform, lets you model all FRA regulations, company rules, and even tacit knowledge on the system. This creates a solid planning foundation that will enable planners to make decisions that are 100% compliant with regulations while advancing your company's objectives.

Conventional turnkey solutions may offer some flexibility, but if it doesn't meet all your business needs, you risk being exposed to unforeseen rule violations and extra costs further down the line. An 80% fit equals 0% value if the solution ends up costing you more than the savings on the initial investment.



Step 3: Plan towards your business goals and KPIs

To ensure you meet your targets and benchmarks, your plans have to revolve around your business objectives and KPIs. More importantly, you need a system that will help you achieve maximum cost and operational efficiency.

The Quintiq platform constantly looks for the best option to reach your goals, and will propagate any changes you make to the rest of the plan — something that's almost impossible to do in a siloed environment.

It features world record-breaking optimization technologies that have bested the toughest optimization challenges in workforce planning, pick-up and deliveries, and vehicle routing. Planners see on average between 5% and 20% gains in efficiency that, when applied across the organization, provide transformative results.

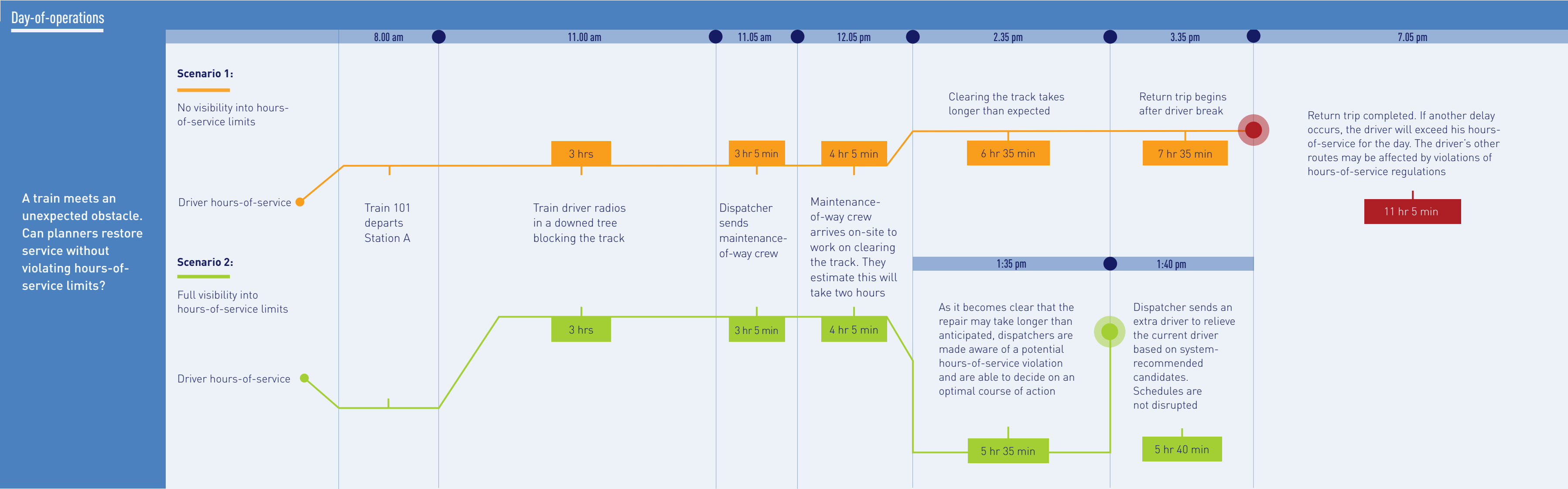
Step 4: Make changes on the go

Mobile applications are an extension of your planning platform and can be a tremendous boost to your operations. It can alleviate your planners' administrative burden by allowing your crew to update the system with their hours-of-service. It can also enable your crew to receive schedule updates and propose changes in real time. The planning platform does all this, while ensuring full regulatory compliance and KPI adherence.



The key to creating optimal plans across all planning horizons

An intelligent planning platform that provides complete visibility into the hours-of-service limits and real-time decision support can make all the difference in complying with FRA regulations.



Short-term

A sporting event is coming up on Saturday night. Can planners accommodate the additional demand on service without violating hours-of-service limits?

Scenario 1:

No visibility into hours-of-service limits

- Monday Planners decide to add more trains to service on the night of the event
- Saturday The event goes off without a hitch, and customer satisfaction is quite high due to no delays in service

Some drivers hit the end of their service limits resulting in new drivers needing to be called in, costing the rail operator avoidable expenses. Service levels are also disrupted as a result

Scenario 2:

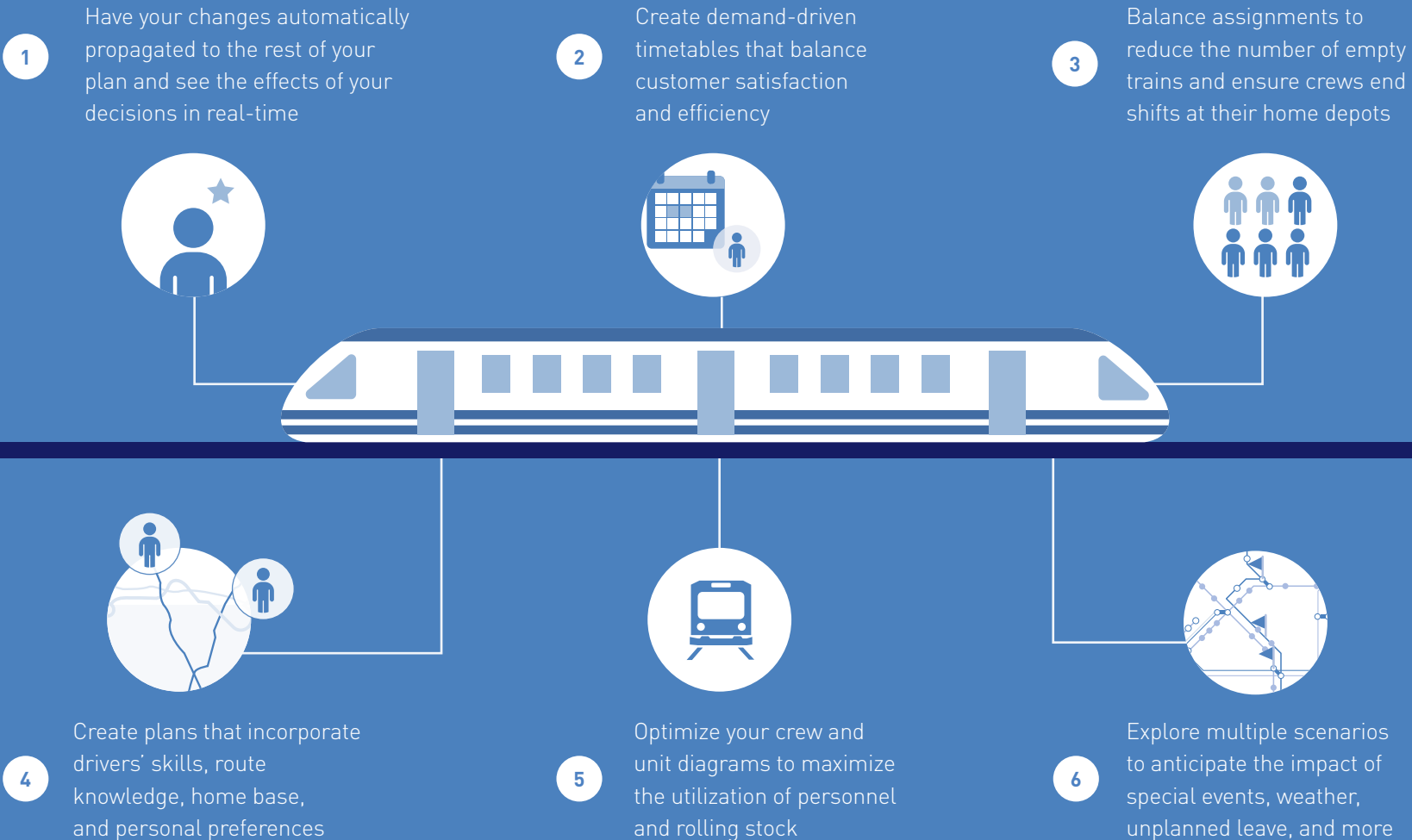
Full visibility into hours-of-service limits

- Monday Planners can see that by adding future train service, five of their scheduled drivers will run into hours-of-service limitations the following week
- Planners decide to increase the number of trains provided, but less than originally considered
- Saturday Trains run smoothly the night of the event with minor delays due to an increased volume of passengers

Service runs smoothly and is not negatively affected by decisions made around the sporting event

Beyond FRA compliance: Create better plans faster with Quintiq

Imagine what an intelligent, integrated planning and optimization platform can do for you.





“ We’ve begun on our digital journey as we recognize what technology can do for rail — delivering more for less. ”

– Theo Haughton, Head of Strategy and Business Planning for Rail and Underground, Transport for London

Leading rail operators plan for efficiency with Quintiq

Transport for London: Transforming the Underground

As part of its initiative to modernize the London Underground, Transport for London (TfL) sought a better way to plan and roster for thousands of crew and staff members — spread across 270 stations within its network.

It was crucial that TfL could generate schedules for London Underground operational staff from numerous divisions and locations, but the complexity of planning at this scale is a huge challenge.

In 2015, TfL selected Quintiq to support the London Underground’s long- and medium-term planning, as well as day-to-day operations to improve employee satisfaction, process sustainability, and customer satisfaction.



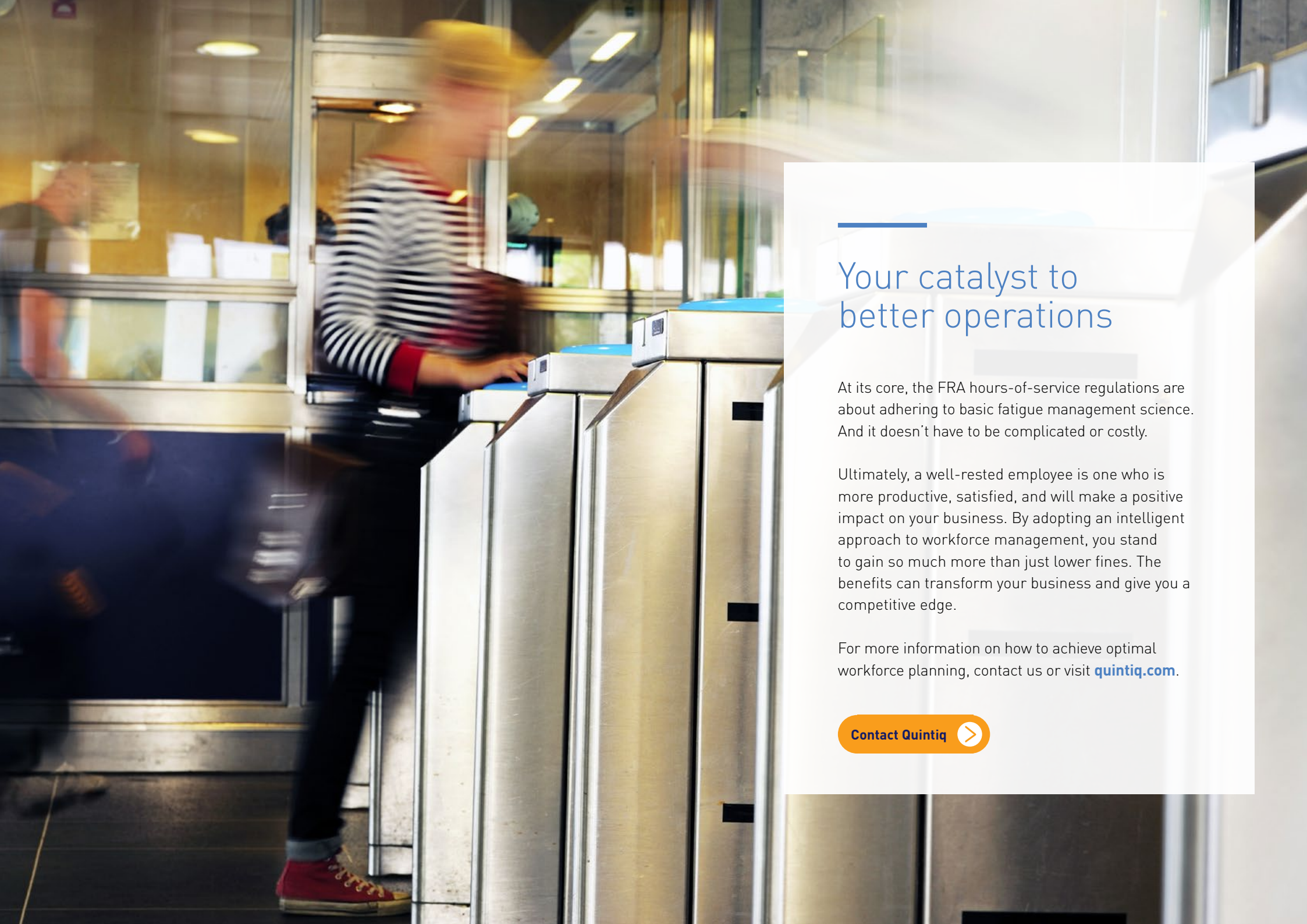
NTV: The premier Italian high-speed rail service

NTV, the first private operator on the Italian high-speed rail network, wanted to get its workforce planning optimized from the start. In 2012, it engaged Quintiq for an integrated planning and scheduling solution that could account for all constraints, business rules, and employee preferences.

Today, the service offers comfortable travel, rich entertainment experiences, and customized services at competitive prices to more than four million passengers a year. It boasts an incredible on-time rate of 95.2%, thanks to the Quintiq solution that is used to optimize the utilization of NTV's entire fleet and personnel from the long-term down to the day-of-operations.

“ We were primarily looking for three things: a flexible approach, excellent methodology, and the capacity to support a project in the start-up phase. Quintiq was the one that responded to our unique needs. ”

– Paolo Ripa, Passenger Director, NTV



Your catalyst to better operations

At its core, the FRA hours-of-service regulations are about adhering to basic fatigue management science. And it doesn't have to be complicated or costly.

Ultimately, a well-rested employee is one who is more productive, satisfied, and will make a positive impact on your business. By adopting an intelligent approach to workforce management, you stand to gain so much more than just lower fines. The benefits can transform your business and give you a competitive edge.

For more information on how to achieve optimal workforce planning, contact us or visit [quintiq.com](https://www.quintiq.com).

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