API RP 755

Fatigue Management in Oil & Gas

How Employee Scheduling Solutions Can Increase API RP 755 Compliance and Efficiency

shiftboard.

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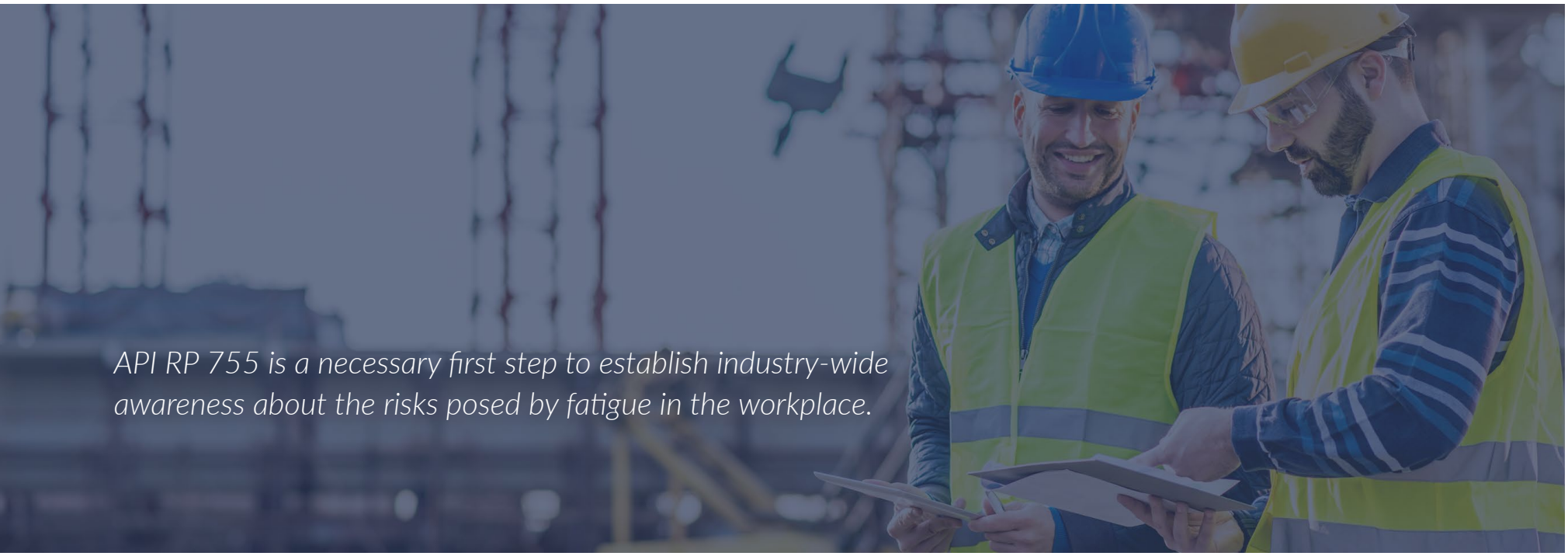


Why Was API RP 755 Created?

If you think safety program management is expensive for an oil and gas company, an accident involving employees and others can be even more costly to the company long term. In petroleum industries in particular, having clear safety rules and regulations for the workplace can be a matter of life and death.

On March 23, 2005, the BP Texas City refinery experienced explosions and fires that resulted in 15 deaths, 180 injuries, and billions of dollars in economic loss. A 2-year investigation from the Chemical Safety Board (CSB) identified several technical and organizational deficiencies – among them was the finding that the operators had been working 12-hour shifts for as many as 29 consecutive days.

In response to this important finding, the American Petroleum Institute (API) created Recommended Practice 755 (RP 755):Fatigue Risk Management Systems for Personnel in the Refining and Petrochemical Industries. The purpose of API RP 755 was to introduce "fatigue prevention guidelines for the refining and petrochemical industries that, at a minimum, limit hours and days of work and address shift work." This was a necessary first step to establishing industry-wide awareness about the risks posed by fatigue in the workplace.

Learn More | CSB's Final Investigation Report | Anatomy of a Disaster documentary about the Texas City incident | API RP 75 guidelines

Which Industries Are Affected?

API RP 755 applies to refineries, petrochemical and chemical operations, natural gas liquids extraction plants, and other facilities such as those covered by the Occupational Safety and Health Administration (OSHA) Process Safety Management Standard, 29 CFR 1910.119.

Which Workers Are Affected?

Safety guidelines apply to employees and contractors who perform process safety-sensitive actions during night shifts, rotating shifts, extended hours/days, or call-outs. Safety guidelines also apply to managers and supervisors who make process and safety-sensitive decisions.

What Is Fatigue Risk Management?

Everyone experiences fatigue. A bad night's sleep can have immediate effects on our mood, reasoning abilities, and even physical appearance. However, prolonged sleep deprivation can have serious consequences for our health, including an increased likelihood of developing cancer and heart disease.

Shift work can cause additional fatigue. Even though risk is a common part of everyday life, many 24/7 operations observe a higher frequency of overtime and extended work shifts which amplifies the potential for hazards. At its best, excessive fatigue can lead to decreased performance and worker dissatisfaction. At its worst, it can result in an injury or a fatal accident.

Addressing fatigue in the workplace requires a comprehensive approach that integrates scientific and medical knowledge with a practical understanding of operational issues.

Several studies have found that tired and sleepy workers are 70 percent more likely to be involved in accidents than well-rested individuals.

A Fatigue Risk Management System (FRMS), as described in API RP 755, refers to a comprehensive framework for addressing the risks that may arise from fatigue. Instead of reactionary measures, it emphasizes the optimization of workplace safety at all levels of an organization, before an incident occurs. It encompasses the training and

education of employees, in addition to outlining successful management strategies for supervisors.

Fatigue management is a shared responsibility between the managers and the employees. While risk cannot be eliminated, having a scientifically sound, cooperative, fully implemented, and continuously improved FRMS is a necessary first step. Shell Oil, using a robust employee scheduling solution, became the first major oil company to gain full compliance with API RP 755 guidelines across all of its U.S. refineries.

Why Should You Care?

While it is hard to quantify the impact of employee fatigue on a company's bottom line, the high cost of ignoring the issue is undeniable. When making investment decisions regarding fatigue risk management initiatives, it is essential to consider the many ways employee fatigue can impact workplace operations:

- Overall well-being of employees
- Health benefit costs resulting from job-related injuries
- Productivity losses due to accidents, facility damages, and worker burnout
- Potential for litigations and complaints
- Employment perceptions of highly skilled labor recruits

WHAT IS FATIGUE?

Symptoms

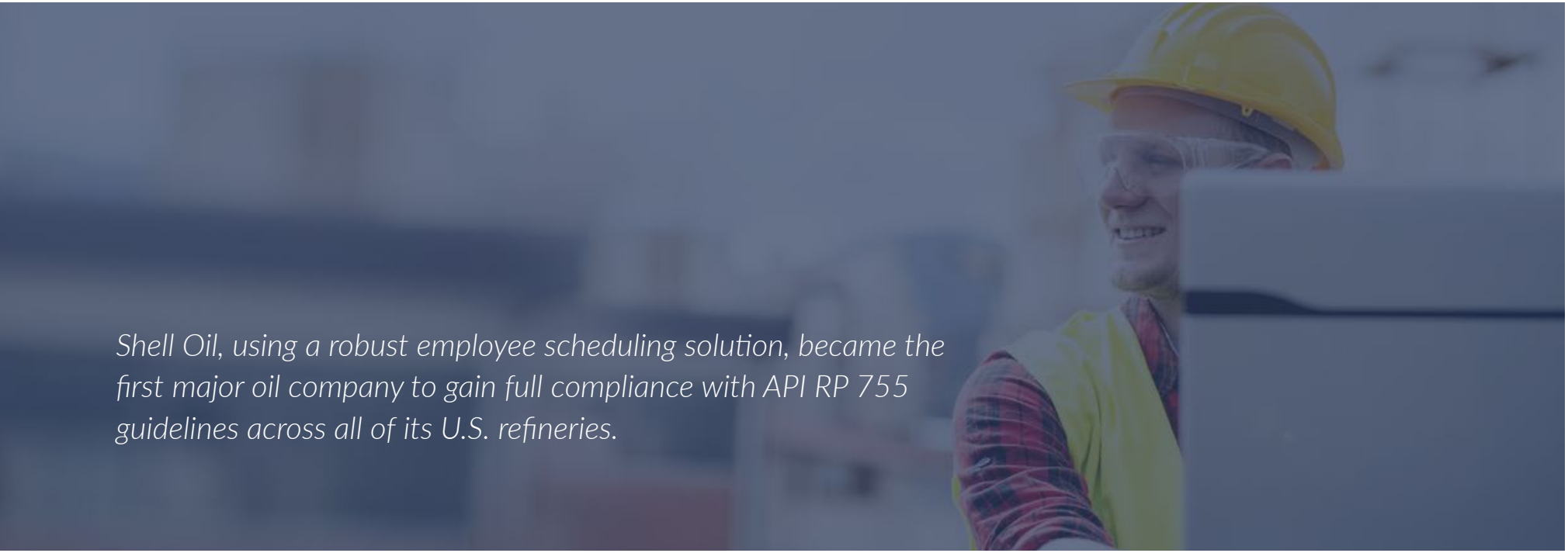
-Impaired alertness
-Reduced motor skills
-Slower reaction time

Causes

-Sleep deprivation
-Sleep disorders
-Strenuous work
-Illness or disease
-Stimulant drug use
-Medical side-effect

Effects

-Impaired cognition
-Risk of human error
-Increased irritability
-Absenteeism
-Reduced morale
-Reduced productivity

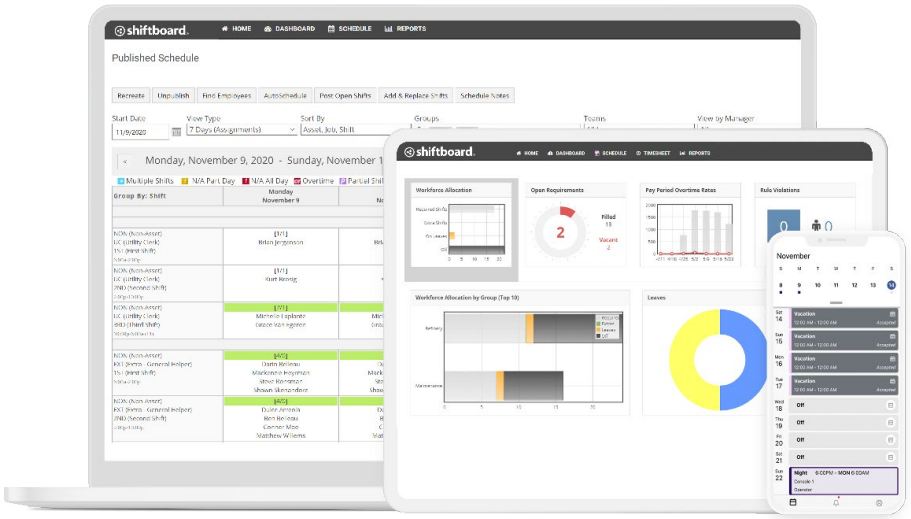


How Can an Employee Scheduling Solution Mitigate Risk?

A core component of API RP 755 is its Hours of Service guidelines, which provides employee scheduling rules for the maximum number of shifts to be scheduled per employee, and the maximum length of each scheduled shift. It also provides guidance about the minimum rest time required between work sets for each shift pattern, including 12-hour, 10-hour, and 8-hour shifts (see Appendix A).

Compliance with these complex rules using a manual scheduling process such as Excel can be a time-consuming and error-prone task. The variance in rules for outages can add to the complexity of managing hundreds or perhaps thousands of employees. An inefficient scheduling practice can lead to severe losses in productivity, compliance violation or in the worst case, an accident that could have easily been avoided.

By using a staff scheduling solution that can adapt to all your different industry rules and guidelines, you can simplify and save precious management time, while ensuring your organization is API RP 755 compliant. Solutions such as Shiftboard are an easy-to use software that is designed to help detect, mitigate and address scheduling issues based on API RP 755, as well as other government, industry and union regulations.



Shiftboard Benefits + Features

- Built-in API RP 755 rules library (editions 1 and 2)
- Continuous monitoring and enforcement of schedule compliance against API RP 755 rules
- Easy-to-understand explanation of rule deviations and schedule action impact
- Audit reports about rules deviation, rule overrides and justifications

Appendix A: API RP 755 Hours of Service

(Section 4.8–Hours of Service Limit)

	12-Hour Shift	10-Hour Shift	8-Hour Shift
1 **Maximum Consecutive Shifts (Day or Night) in a Work Set**			
Normal Operations	7 Shifts	9 Shifts	10 Shifts
Outages	14 Shifts	14 Shifts	19 Shifts
2 **Minimum Time Off After a Work Set**			
Normal Operations	36 hours	36 hours	36 hours
Work Set of Four or More Night Shifts	48 hours	48 hours	48 hours
After 84 Hours or More (Day or Night)	48 hours	48 hours	48 hours
Outages	36 hours	36 hours	36 hours
3 **Extended Shifts**			
Unsubscribe Maximum Shifts	18 hours	16 hours	16 hours
Time Off After Shift			
10 to 16-Hour Shift	N/A	N/A	8 hours
12 to 16-Hour Shift	N/A	8 hours	N/A
14 to 16-Hour Shift	8 hours	8 hours	N/A
>16 to 18-Hour Shift	10 hours	N/A	N/A
Maximum # of Extended Shifts per Workset	1	One for 14-hour shifts; two for 12-hour shifts; for three or more 12-hour shifts, follow 12-hour "Normal Operations" guideline above.	Two, if > 12 hours in duration; extended shifts must be non-consecutive. If more than two, follow 12-hour "Normal Operations" guidelines above.

**Note: 9/80 schedules will be administered under the above noted "10-Hour Shift" guidelines above.*

1 The first section outlines the maximum number of shifts per work set before a 36-hour or 48-hour break is required.

2 The second section shows the minimum rest time between work sets.

3 The third section displays the maximum amount of time that a shift may be extended beyond the regular shift hours as well as the corresponding rest times.

Appendix B: API RP 755 Reports

Easily track which API RP 755 rules you may be violating. Produce reports in seconds to identify the deficiencies in your scheduling.

Table B1: Work Rule Audit Report

Friday August 30 2013 - Friday August 30 2013

All Craft Position/Job Area (LOC)

							OVERTIME				
Employee #	First Name	Last Name	Date	Start	End	Reg Hrs	Reg	Multp	Total	Work Rule Name	Work Rule Detail
0000133	John	Doe	8/30/2013	6:30 AM	3:00 PM	8.00	0.00	1.5	0.0	API 755 MRP	Too many shifts. Current work set has 25 shifts with 7 maximum shifts allowed.
00002553	Heather	Letetia	8/30/2013	6:30 AM	3:00 PM	8.00	0.00	1.5	0.0	API 755 MRP	Too many extended shifts. Current work set has two 14+ hours extended shifts with one 14-hours extended shifts allowed.
0003305	Sonya	Barone	8/30/2013	6:30 AM	3:00 PM	8.00	0.00	1.5	0.0	API 755 MRP	Too many shifts. Current work set has 11 shifts with 10 maximum shifts allowed.
00006453	Crystal	Bolduc	8/30/2013	6:30 AM	3:00 PM	8.00	0.00	1.5	0.0	API 755 MRP	Too many shifts. Current work set has 11 shifts with 7 maximum shifts allowed.
0002044	Caroline	Boll	8/30/2013	6:30 AM	3:00 PM	8.00	0.00	1.5	0.0	API 755 MRP	Too many shifts. Current work set has 11 shifts with 10 maximum shifts allowed.

BEFORE PUBLISHING A SCHEDULE

- Double-check your compliance: union rules, overlapping shifts, skill restrictions and API RP 755
- Instantly identify issues and deviations
- Fix schedules before distributing to employees

AFTER PUBLISHING A SCHEDULE

- Produce audit reports instantly – whether for internal or external reviews
- Export reports in different formats: PDF, Excel, CSV, text, or image
- Track your compliance progress

Table B2: Deviation Report

ABC Company
API RP 755 Deviation
Tuesday, April 28, 2020 - Thursday, May 21, 2020
All

Date	Maximum Shift	Time off after Extended Shift	Too Many Extended Shift	Consecutive Extended Shift	Total	Employees	Failure Override Reasons
4/28/2020	1	0	0	0	1	Dianna Beaconsall	
4/29/2020	0	0	0	0	0		
4/30/2020	1	0	1	0	2	Dianna Beaconsall	
5/1/2020	0	0	0	0	0		
5/2/2020	1	1	1	0	3	Dianna Beaconsall, Marigold Brahan	
5/3/2020	1	0	0	0	1	Dianna Beaconsall	
5/4/2020	2	0	1	0	3	Dianna Beaconsall, Hadleigh Benoist	COD3
5/5/2020	2	2	1	0	5	Lesley Andrich, Dianna Beaconsall, Hadleigh Benoist	
5/6/2020	2	1	1	0	4	Dianna Beaconsall, Hadleigh Benoist, Marigold Brahan	COD3
5/7/2020	2	1	0	0	3	Dianna Beaconsall, Hadleigh Benoist, Marigold Brahan	
5/8/2020	3	0	1	0	4	Dianna Beaconsall, Hadleigh Benoist	
5/9/2020	1	0	0	0	1	Dianna Beaconsall	
5/10/2020	0	0	0	0	0		
5/11/2020	2	0	0	0	2	Dianna Beaconsall, Hadleigh Benoist	
5/12/2020	2	0	0	0	2	Dianna Beaconsall, Hadleigh Benoist	
5/13/2020	2	0	0	0	2	Dianna Beaconsall, Hadleigh Benoist	
5/14/2020	2	0	0	0	2	Dianna Beaconsall, Hadleigh Benoist	
5/15/2020	0	0	0	0	0		
5/16/2020	0	0	0	0	0		
5/17/2020	0	0	0	0	0		
5/18/2020	0	0	0	0	0		
5/19/2020	0	0	0	0	0		
5/20/2020	0	0	0	0	0		
5/21/2020	0	0	0	0	0		
Total	24	5	6	0	35		

Table B3: Work Set Count

API RP 755 Work Set Count

Friday August 30 2013 - Friday August 30 2013

All Craft Position/Job Area (LOC)

Legend

Night Shift

48 Hour Break Required

Employee Name	Fri 8-30	Sat 8-31	Sun 9-1	Mon 9-2	Tue 9-3	Wed 9-4	Thu 9-5	Fri 9-6	Sat 9-7	Sun 9-8	Mon 9-9	Tue 9-10	Wed 9-11	Thu 9-12	Fri 9-13	Sat 9-14	Sun 9-15	Mon 9-16	Tue 9-17	Wed 9-18	Thu 9-19	Fri 9-20	Sat 9-21	Sun 9-22	Mon 9-23	Tue 9-24	Wed 9-25	Thu 9-26
Jennifer Adams	5			1	2	3	4	5																				
Bill Aden	5			1	2	3	4	5			1	2	3	4	5			1	2	3	4	5			1	2	3	4
Sahra Adrian																												
Moeta Alvarez																												
Angelica Arseneau	5			1	2	3	4	5			1	2	3	4	5			1	2	3	4	5			1	2	3	4
Bret Barnes	5			1	VAC	VAC	VAC	VAC	PD	PD	1	2	3	4	5			1	2	3	4	5			1	2	3	4
Marjorie Barone	5			1	2	3	4	5			1	2	3	4	5			1	2	3	4	5			1	2	3	4
Mary Bassett																												
Kelley Beals																												
Jamie Beam																												
Ketler Beard	WR			WR	WR	WR	WR	WR			WR	WR	WR	WR	WR			WR	WR	WR	WR	WR			WR	WR	WR	WR
Wendy Bedard	5			5	5	5	5	5			1	2	3	4	5			1	2	3	4	5			1	2	3	4
Paulin Belisle	5			5	5	5	5	5			1	2	3	4	5			1	2	3	4	5			1	2	3	4
Jerry Bell	SICK			SICK	SICK	SICK	SICK	SICK			SICK	SICK	SICK	SICK	SICK			SICK	SICK	SICK	SICK	SICK			SICK	SICK	SICK	SICK
Stacie Bellande	5			5	5	5	5	5			1	2	3	4	5			1	2	3	4	5			1	2	3	4

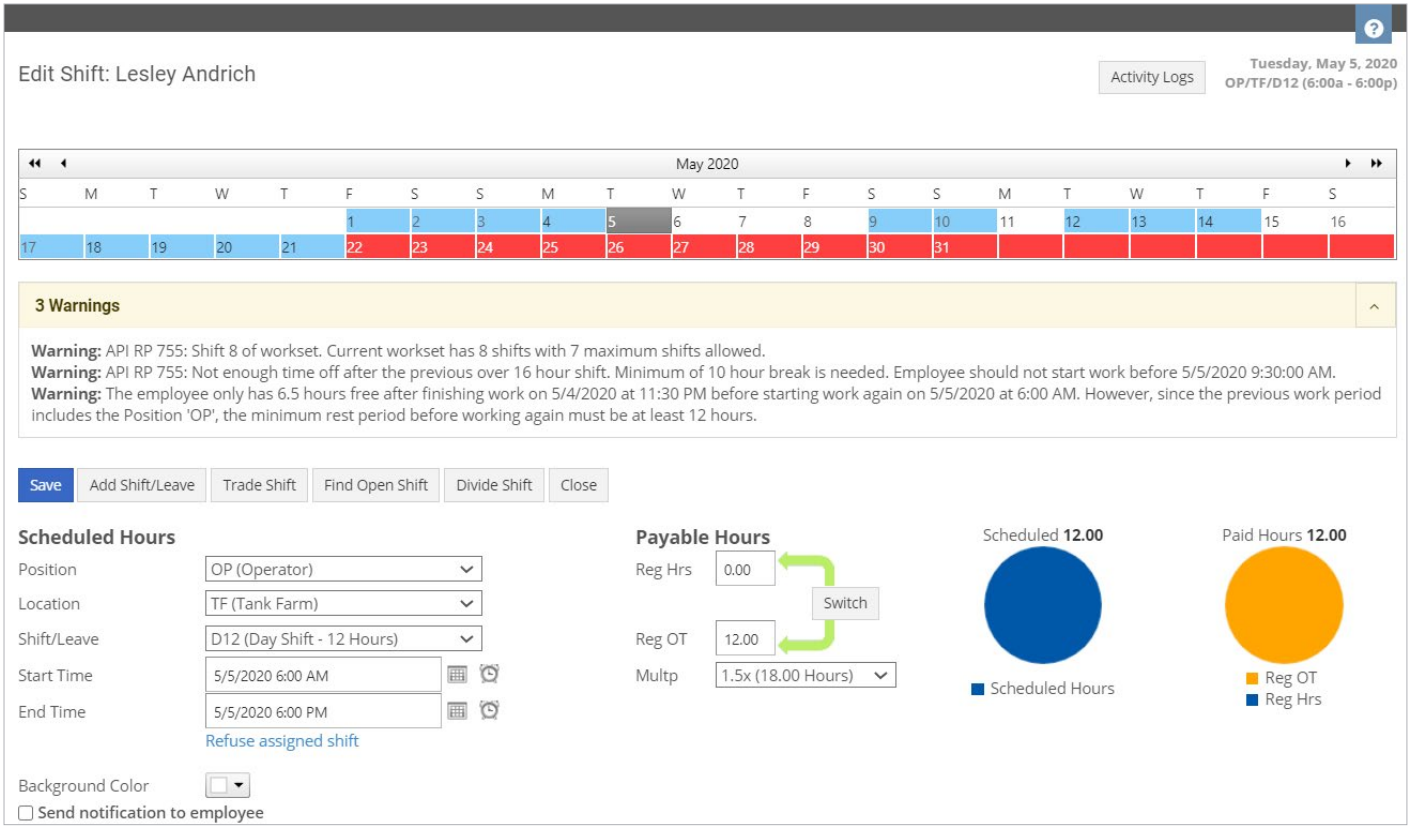
One of the most important aspects of complying with API RP 755 is knowing when an employee is required to take a break in between work sets.

Identifying the mandatory rest times can be a laborious task, but this report takes the hassle out of performing shift counts on an employee-by-employee basis by showing you visually when API RP 755 triggers a 48-hour break.

Tip: Use the Hours of Service matrix with this report to identify the correct scenarios e.g., Does your work set occur during an outage?

-Filter by group and position
-Easily review the length of work sets
-Differentiate between day and night shifts
-Instantly capture where a 48-hour break is required

Table B4: Individual Employee View



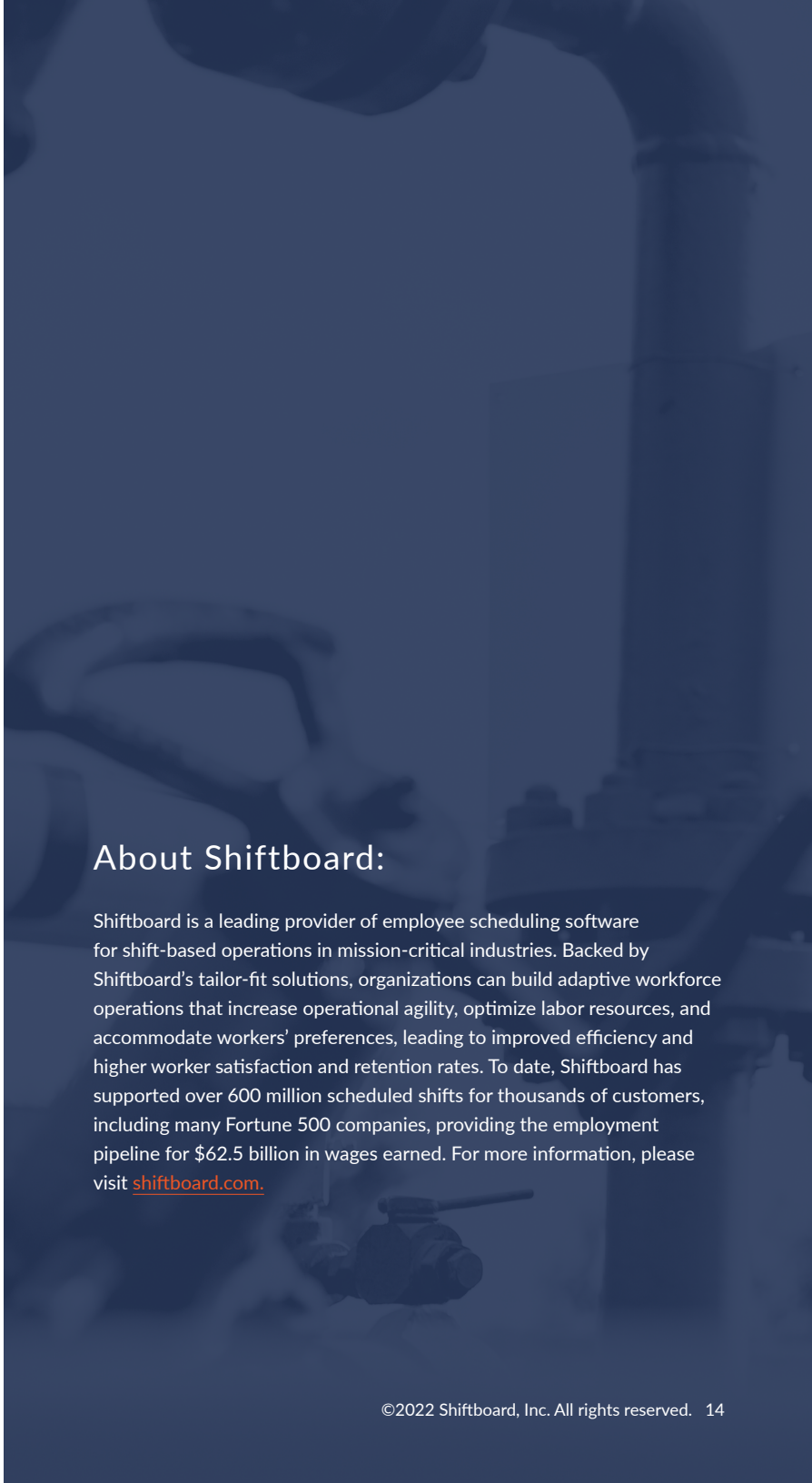
While complying with API RP 755 is an important priority, extended shifts and overtime may be necessary for certain scenarios. Unexpected shortages or workplace emergencies may require managers to manually schedule employees for overtime hours.

Shiftboard allows organizations to schedule shifts outside of API RP 755 guidelines, but notifies the scheduler about which rules are being broken and why. Exceptions created are logged, and the records are accessible through the various built-in reports.

Shiftboard and Compliant Workforce Scheduling

In addition to API RP 755, leading enterprises such as Shell, BASF, and INEOS rely on Shiftboard's solution to ensure workforce scheduling compliance in the following areas:

- Pipeline and Hazardous Materials and Safety Administration (PHMSA) CFR 49 192 and 195
- Labor laws
- OSHA regulations
- Collective bargaining agreements/union agreements
- Federal/state/local regulations
- Internal policies relating to Hours of Service, employee assignment order, overtime equalization, and more



About Shiftboard:

Shiftboard is a leading provider of employee scheduling software for shift-based operations in mission-critical industries. Backed by Shiftboard's tailor-fit solutions, organizations can build adaptive workforce operations that increase operational agility, optimize labor resources, and accommodate workers' preferences, leading to improved efficiency and higher worker satisfaction and retention rates. To date, Shiftboard has supported over 600 million scheduled shifts for thousands of customers, including many Fortune 500 companies, providing the employment pipeline for $62.5 billion in wages earned. For more information, please visit shiftboard.com.

