

Managing Fatigue

PIPELINE
PERFORMANCE GROUP 
Call: 770-856-5713



Calculating Your Fatigue Risk Level

Follow the steps to assess your personal fatigue risk level

Step 1: How many hours did you sleep in the last 24 hours?

SLEEP	Less than 2 hours	3 hours	4 hours	5 hours
POINTS	12	8	4	0

Step 2: How many hours did you sleep in the last 48 hours?

SLEEP	Less than 8 hours	9 hours	10 hours	11 hours	12 hours or more
POINTS	8	6	4	2	0

Step 3a: How many hours have you been awake since your last sleep?

Step 3b: How many hours will you be awake at the end of the work day?

This provides you an assessment for the fatigue risk level at the beginning and end of the shift.

If sleep amount in step 2 is greater than hours awake, points = 0

If sleep amount in step 2 is less than hours awake, add 1 point per hour awake greater than sleep in step 2

Step 4: Total the points to determine your score.

SCORE	ACTION
1-4	Keep an eye on yourself.
5-8	Have someone else keep an eye on you.
9+	Go to bed.

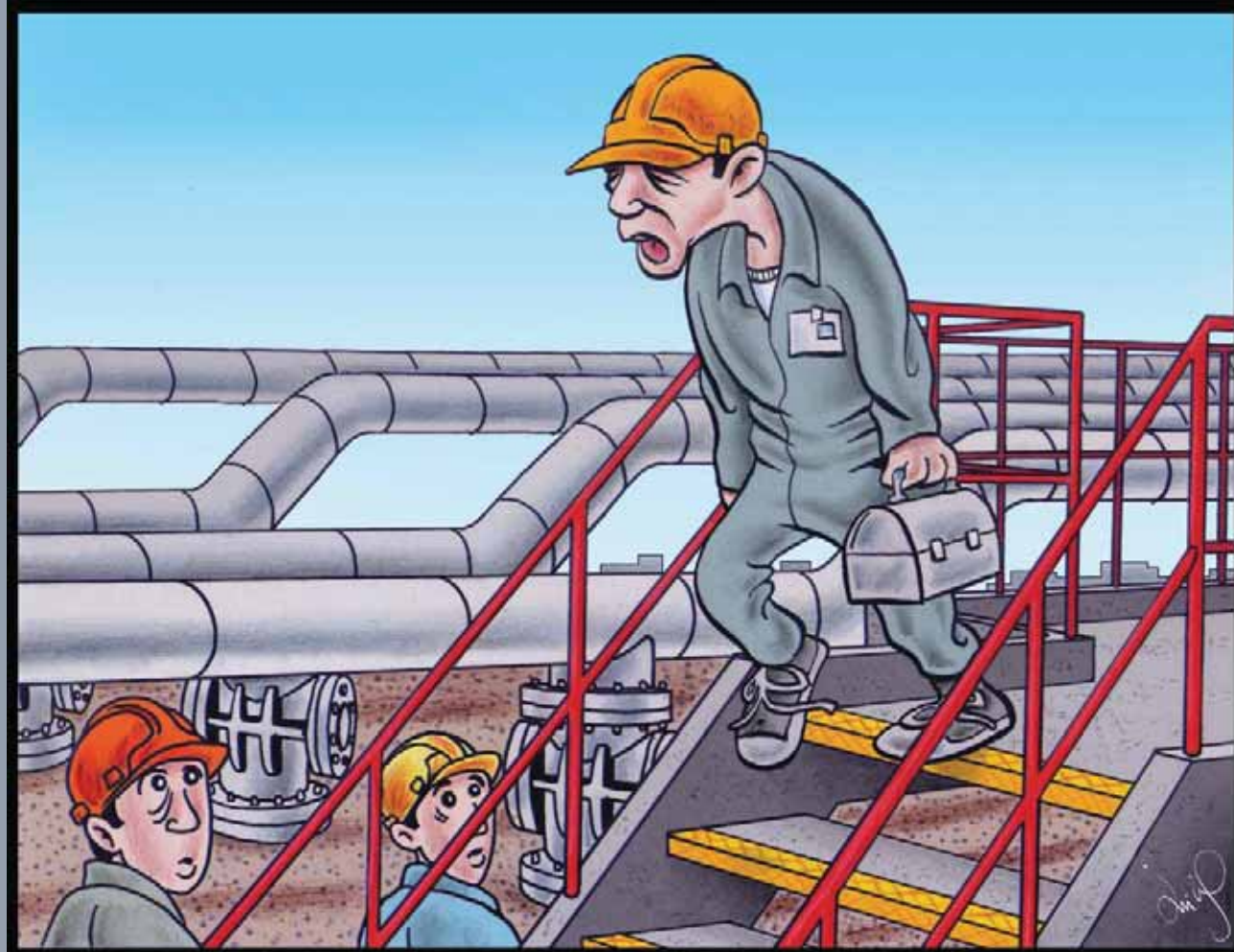
This is an adaptation of the index used by various transportation industry modes to assess fatigue risk.

Example

I slept 4 hours in the last 24, 11 hours in the last 48, have been awake 3 hours at the beginning of the shift and will have been awake 15 hours at the end of my shift.

The points in step 1 are 4; points in step 2 are 2; points in step 3a are 0 for a total of 6. Watch me, please! The points in step 3b are 4 and the total is 10. I need to go to bed!

Why Managing Fatigue is Important



Fatigue affects people differently. Some get by on a few hours sleep; others sleep ten hours or more. A good rule is to get eight or more hours of sleep out of each 24-hour day. The 2009 “Sleep in America” poll showed that most Americans sleep less than seven hours on workdays.

It is important that companies provide employees the opportunity to get at least eight hours of sleep between work assignments. The consequences for public safety are leading governments to impose regulations about fatigue management in many industries.

Fatigue can have serious consequences. People who are fatigued are more likely to make errors and to be less productive on the job. They have accidents.

This calendar and the monthly articles provide education on managing fatigue. It is not a substitute for the advice of medical professionals. If you have a sleep problem, see a doctor.

Sleep is Important



I am 62 and have never worked a 9-to-5 work schedule. I either worked rotating shifts, long days as a construction worker, or long days as a manager. As a result of work schedules and personal choices, there were years when I slept about five hours per night. How could that affect a person?

Sleep deprivation can lead to

- Obesity
- Diabetes
- Hypertension
- Heart disease
- Mood disorders
- Reduced life expectancy

People who are shift workers and people who work long, irregular hours are more likely to have sleep problems and sleep deprivation. In the realm of public safety, sleep deprivation can lead to

- Accidents
- Injuries
- Death

Drowsy driving causes approximately 1 million crashes, 500,000 injuries, and 8,000 deaths each year in the U.S.
<http://beds.com/lackofsleep/>

January 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1 New Year's Day
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17 Martin Luther King Jr. Day	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

Sleep Problems Can Lead to Other Problems



Do you snore or live with a snorer?

Do you have trouble falling asleep or staying asleep?

Do you take a “sleep aid” on a regular basis?

Do you have “restless legs” that keep you awake?

The snorer is often pictured as a comical figure, oblivious to the problem. The other person in the room is viewed as the victim of the snorer.

There is nothing comical about sleep disorders. At your annual checkup, discuss sleep difficulties with a doctor.

Does your doctor ask about sleep problems? Do you mention sleep problems? An estimated 50 to 70 million Americans suffer from some type of sleep disorder. <http://healthysleep.med.harvard.edu>

Discuss with your coworkers and your family the prevalence of sleep problems. Take appropriate steps to address their effects on health and safety.

February 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2 Groundhog Day	3	4	5
6	7	8	9	10	11	12 Lincoln's Birthday
13	14 Valentine's Day	15	16	17	18	19
20	21 Presidents' Day	22	23	24	25	26
27	28					

Watch Your Circadian Rhythms



Human beings have internal mechanisms that keep us awake for about 16 hours and make us want to sleep about eight hours. This is the **circa** (around)**dian** (a day) **rhythm**.

We do not have to understand the scientific facts to know that we get hungry several times a day, are more alert at certain times, and get sleepy at regular times.

When we wake up, it's time to eat and drink. After a meal (or a dose of caffeine), we are ready to face the day. How long does that last before we need a pick-me-up? How many times a day do we get drowsy?

Can you stay awake when your brain is telling you to sleep? In control rooms around 4:00 am, people want to nod off in their comfortable chairs. They are required to remain alert but want to sleep. What do you do to respect your circadian rhythm?

How do you meet the requirements to remain alert?

March 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
Daylight Savings				St. Patrick's Day		
20	21	22	23	24	25	26
27	28	29	30	31		

Getting All of Life's Tasks Done



“Life sometimes gets in the way” is how a shift worker explained staying up to watch his son play in a baseball game instead of sleeping between two night shifts.

How do people manage their lives if they work eight to twelve hours? We have to commute, run errands, spend time with family and friends, and do many other tasks.

When we work a 12-hour shift and commute, a wise person is going to use eight hours of the remaining time to sleep. Days off can be used for important family events.

This requires planning with the family and friends. It also requires education about the effects of fatigue and the importance of sleep.

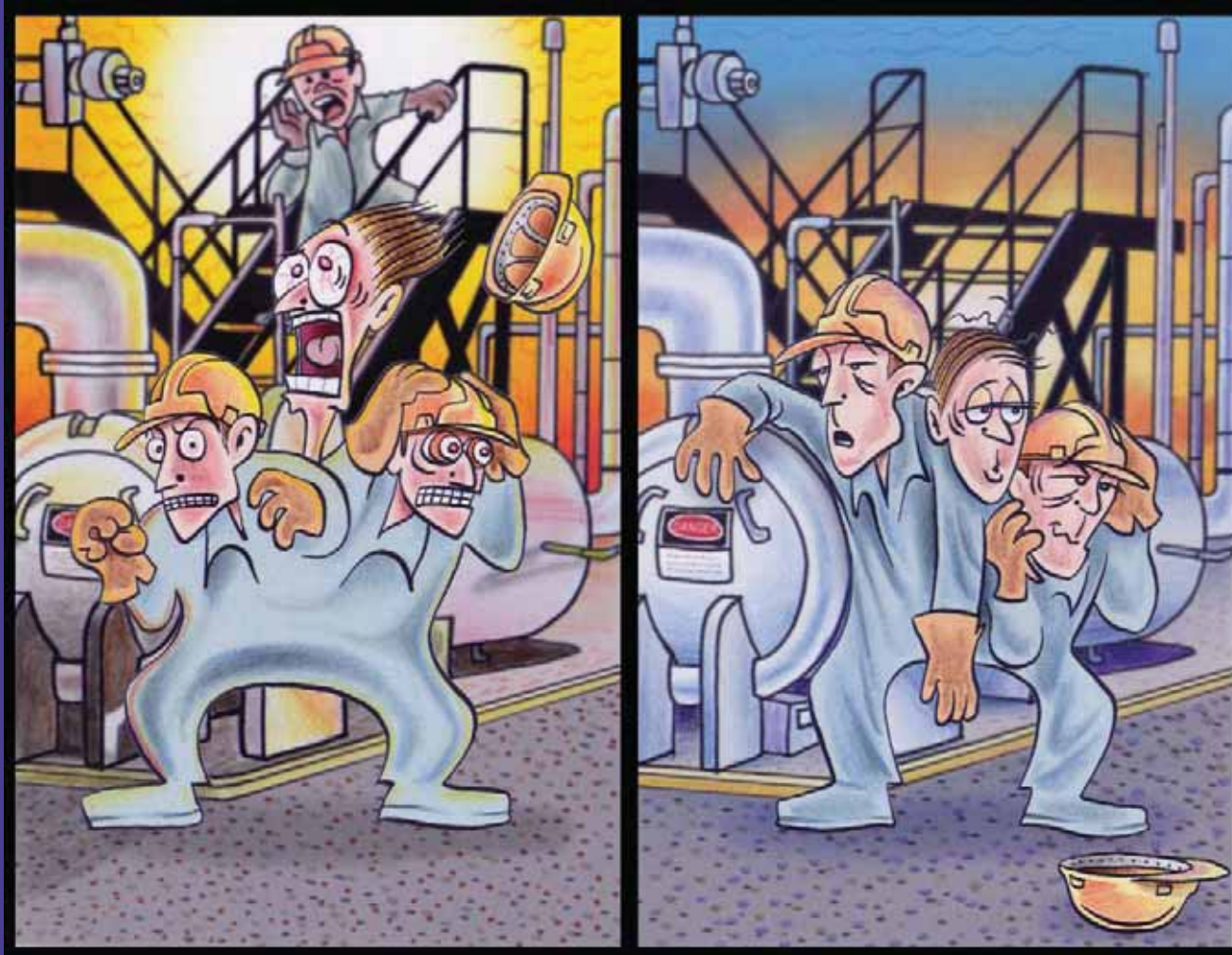
Use a family calendar to mark the days and nights of work, and highlight the days off so that children and other family members can plainly see those dates.

Sleep eight hours each day; it is a high-value necessity.

April 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1 April Fool's Day	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24 Easter Sunday	25	26	27	28	29 Earth Day	30

Stressed AND Fatigued



Work-related stress is a significant problem. Stress is the adverse reaction to work demands. Stressed workers are prone to mistakes and injuries. They are more likely to be absent because of stress and fatigue.

According to a 2007 study by the American Psychological Association, 51% of those under “extreme stress” said that fatigue was the major symptom.

Every person experiences stress on and off the job. The effects of stress can be addressed in healthful ways:

- Sleep
- Exercise
- Proper diet
- Relaxation techniques

After a stress-filled day or night, the immediate effect is relief. The next effect is fatigue.

A company that has enough employees to allow people time off for rest, relaxation, and recreation is valuable. Develop programs that address stress management AND fatigue management.

May 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6	7
8 Mother's Day	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30 Memorial Day	31				

How is Your Sleep Health?



A sleep study revealed that I stopped breathing hundreds of times each night. I was a horrible snorer. A guy who shared a hotel room remarked, after his sleepless night, "I thought a monster was in the room with us."

Sleep apnea is a condition wherein a person stops breathing while asleep. The pause can last from seconds to minutes before the person begins breathing again, with a snort or a cough. The CPAP (continuous positive airway pressure) device enabled me to sleep all night, and I was well rested. The difference in my energy and alertness was amazing.

The most common sign of sleep apnea is loud and ongoing snoring. Another common sign of sleep apnea is falling asleep during the day, at work, or while driving.

If you or someone you know has these signs, seek medical advice now. A CPAP may not be pretty, but it might save your life.

June 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2	3	4
5	6	7	8	9	10	11
12	13	14 Flag Day	15	16	17	18
19 Father's Day	20	21	22	23	24	25
26	27	28	29	30		

The Challenges of Sleeping in the Daytime



Human beings are supposed to sleep at night, not in the daytime. When the sun comes up, the brain tells us to be awake even if we have been working all night. What are your strategies for sleeping in the daytime?

These could be helpful:

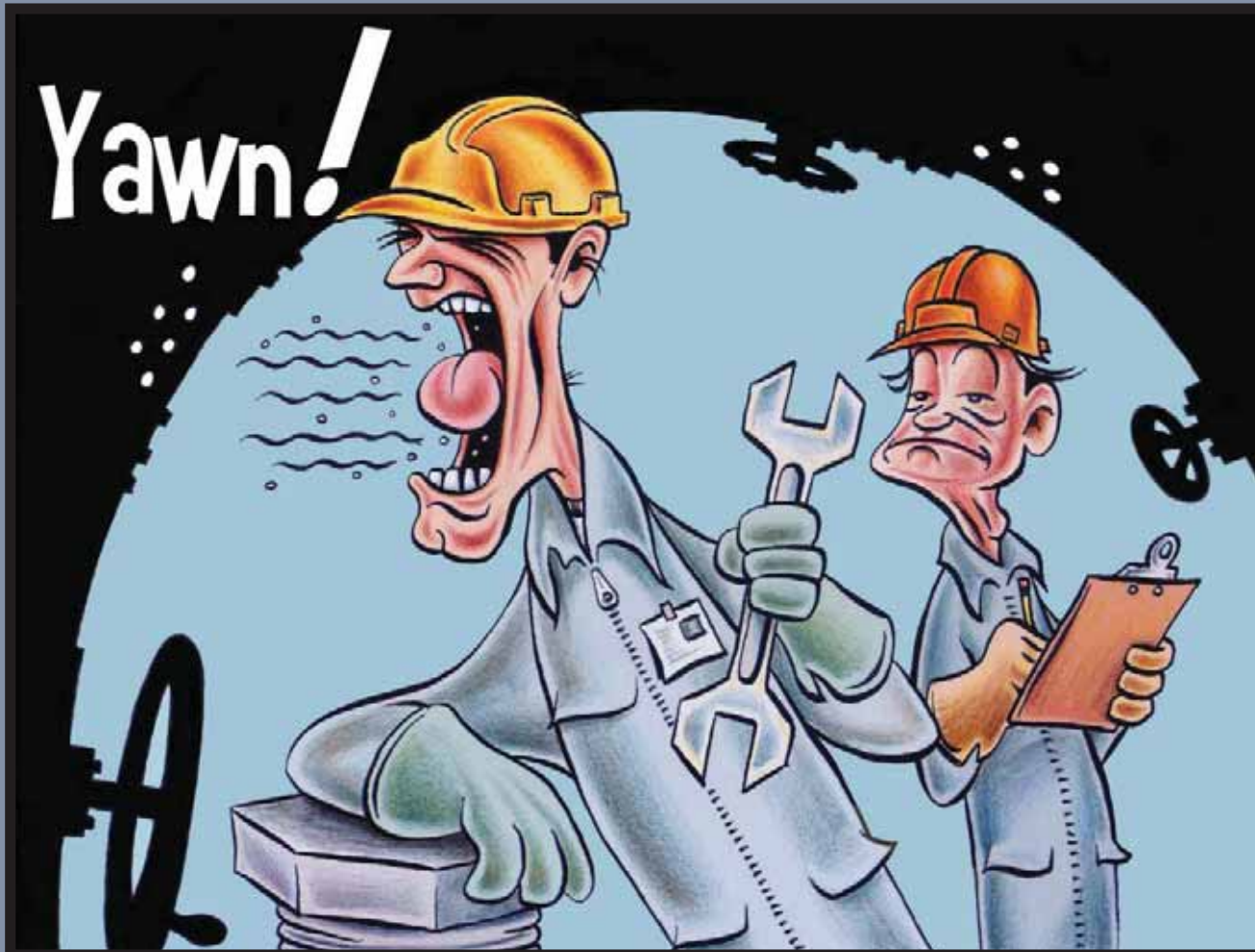
- Reduce exposure to sunlight on the way home.
- Try to avoid caffeine and other stimulants.
- Do not get involved in home tasks; do something relaxing.
- Sleep in a bed in a dark and quiet room.
- Keep the room cool.
- Turn off the phone and other devices.
- Wear ear plugs or noise-canceling headphones to eliminate outside noises.

Since everyone is different, your strategies for sleeping in the daytime might be unique. The goal is to get as much sleep as possible between work assignments.

July 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1	2
3	4 Independence Day	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

Recognizing the Signs of Fatigue



People are not good at knowing when they are fatigued. We tend to keep going, even when the signs of fatigue are present. Watch for these warning signs in yourself or others:

- Frequent yawning
- Drowsiness
- Nodding off
- Sore or tired eyes
- Slow reflexes
- Irritability or anger
- Hunger or thirst
- Loss of concentration
- Reduced ability to pay attention to tasks
- Forgetfulness

In operational settings, managers must be aware when employees performing safety-critical work are fatigued. The physical signs are easy to see, and that is the time to discuss the potential risks of fatigue.

It might be necessary to relieve the employee, and that is the safest approach. Do not let a fatigued employee continue to work or drive home.

August 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

Pressured AND Fatigued



Pressure at work is caused by the demands imposed by the job. How well would you handle these requirements, from actual job postings?

- Handle multiple tasks and stress in a fast-paced environment.
- Process work rapidly, set priorities, and work under pressure.
- Adapt and respond in changing situations.
- Operate system flawlessly while multitasking.

A pipeline controller said, at the end of a shift, "I am walking out of here with my head in my hands." He was mentally exhausted.

Companies and employees need to

- Determine a realistic, safe workload for each job.
- Choose the most critical tasks and delay others when under time pressure.
- Know your personal limits.
- Ask for help when pressure is a concern.

September 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1	2	3
4	5 <small>Labor Day</small>	6	7	8	9	10
11 <small>Grandparents' Day</small>	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

Eat Right to Work Right



This is the list of foods served before a morning meeting at a pipeline facility:

- Doughnuts
- Muffins (extra large)
- Bagels with cream cheese
- Breakfast sandwiches
- Coffee
- Juice

Observations of shift workers indicate preferences for pizza, burgers, and sub sandwiches. I never wanted an apple at 3:00 am, but a fried apple pie was great. It is easy to develop bad habits.

A healthful diet for shift workers includes

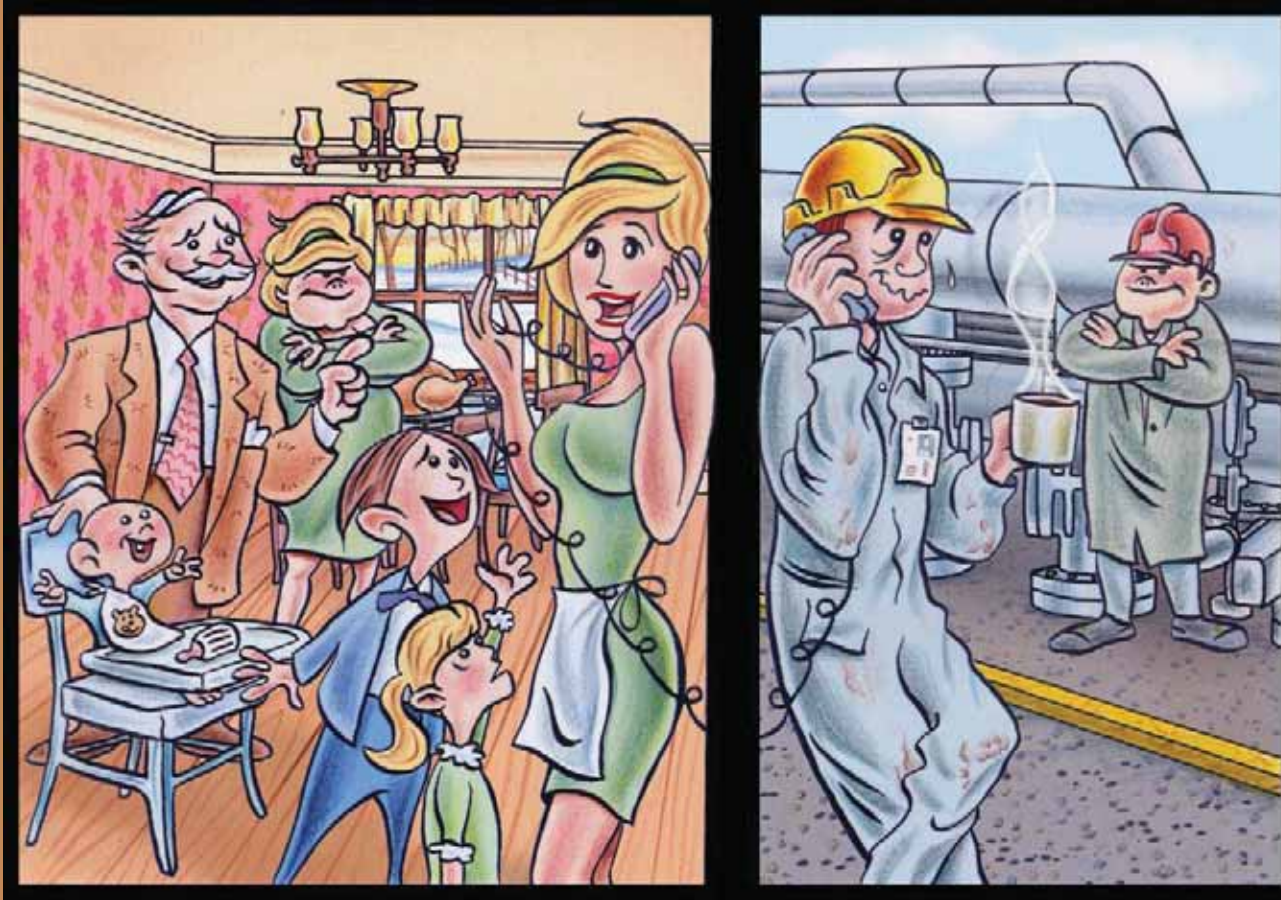
- Fruits and vegetables
- Water
- Whole grains
- Lean proteins
- Low-fat dairy products

Pack your own lunch with healthful foods from home so you do not have to rely on vending machine choices or food delivery places.

October 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1
2	3	4	5	6	7	8
9	10 Columbus Day	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31 Halloween					

Shift Work and Holidays



People have great expectations about holidays. One expectation is that the happy family all gathers around the table on the specific day.

If you have to work on a holiday, extra pay may not be much of a consolation if your family and friends are celebrating without you.

On the job, do not get distracted by thoughts about home and family. Off the job, remember that sleep is a requirement and not an option.

Here are some ways to cope with shiftwork and holidays:

- At the beginning of the year, communicate with relatives about what holidays you will work.
- Set realistic expectations about your participation in events.
- Plan to celebrate on an off day close to the holiday or at a different time on the holiday.
- Leave a greeting card at home for the family to read.
- Call home on a break.

November 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2	3	4	5
6 Daylight Savings	7	8	9	10	11 Veteran's Day	12
13	14	15	16	17	18	19
20	21	22	23	24 Thanksgiving Day	25	26
27	28	29	30			

Energy Crisis



There is an energy crisis, and it is not about oil and gas. The real energy crisis is the reliance on energy drinks and caffeine.

The strategic use of caffeine is one way to manage fatigue. Overuse of caffeine can hinder our ability to sleep once we get home. Lack of sleep can result in fatigue, and then we need more caffeine. This cycle of caffeine, disturbed sleep, fatigue, and more caffeine can cause chronic fatigue.

If caffeine is what you use to stay alert, manage your intake so that its positive effects do not have negative consequences. Energy drinks usually contain caffeine, guarana, taurine, and sugar. An experience with Jolt Cola years ago convinced me that a drink with “all the sugar and twice the caffeine” was not what I needed for my energy crisis from shift work.

Be an experiment of one; research better ways to stay alert on the job. Avoid an energy crisis.

December 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
Christmas Day						

Human Factors Consultants

- Control Room Management Plans
- Human Performance Improvement
- SCADA Display Evaluations
- Design and Evaluation of Control Rooms
- Fatigue Risk Management Systems
- Alarm Management Plans
- Training, Procedures, and Policies
- Workload Assessments

Charles Alday has over 44 years of pipeline industry experience in construction, operations, maintenance, management, and consulting. As the Operational Excellence Manager for Colonial Pipeline Company, he worked with people from the frontlines to the boardroom to eliminate pipeline leaks, spills, and errors. Charles provides consulting in pipeline operations, control room management, fatigue risk management, and human performance improvement with pipeline companies in the USA, Canada, and China. He has served on the API working group for an alarm management recommended practice and the IEEE working group for lessons learned program standards and design of computer based displays. He has a MBA from Kennesaw State University and Bachelor's degrees in Philosophy and Accounting from Belmont University.

Michele Terranova holds a PH. D in Industrial/Organizational Psychology with a major in Human Factors from Old Dominion University. She has served as the Director of Human Factors Research at Concord Associates, Inc. and Senior Research Scientist at the Oak Ridge National Laboratory. She has over 20 years experience in Human Factors and User Interface Design. Michele has extensive human factors experience in transportation, nuclear, military, and government.

The recent work of Pipeline Performance Group includes control room design, fatigue risk management, development of performance measures for Beijing Oil and Gas Control Center of PetroChina, control room assessments and plans for several companies, controller training course for PetroChina, training on human performance subjects, managerial coaching, and the writing of a book on human factors for pipeliners. The book, **Pipeliners Are Human**, is available at www.lulu.com. Copies of this calendar can also be purchased there or by calling **770-856-5713** or e-mailing charles@pipelineperformancegroup.com.



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