

Fatigue and Accidents



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Objective(s)

- Explain How Sleep Cycles, Hours and Circadian Rhythm Disturbances Can Develop Into Short-Term, Cumulative and Chronic Effects on Performance and contribute to accidents.

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Why Should We Care ?

- **31%** of All Drivers Have Fallen Asleep at the Wheel Sometime During Their Lifetime
- **56%** of Shift Workers Have Fallen Asleep on the Job
- **55%** of Adults Stated They Experienced Daytime Drowsiness.

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The Human Toll

- 100,000 Fatigue Related Collisions Per Year
- 1,544 Fatigue Related Deaths Per Year
- Imagine:
 - A Boeing 727 Crashing Every Six Weeks
 - Or the Titanic Sinking Once a Year
 - Or an Oklahoma City Bombing Every Month and a Half.

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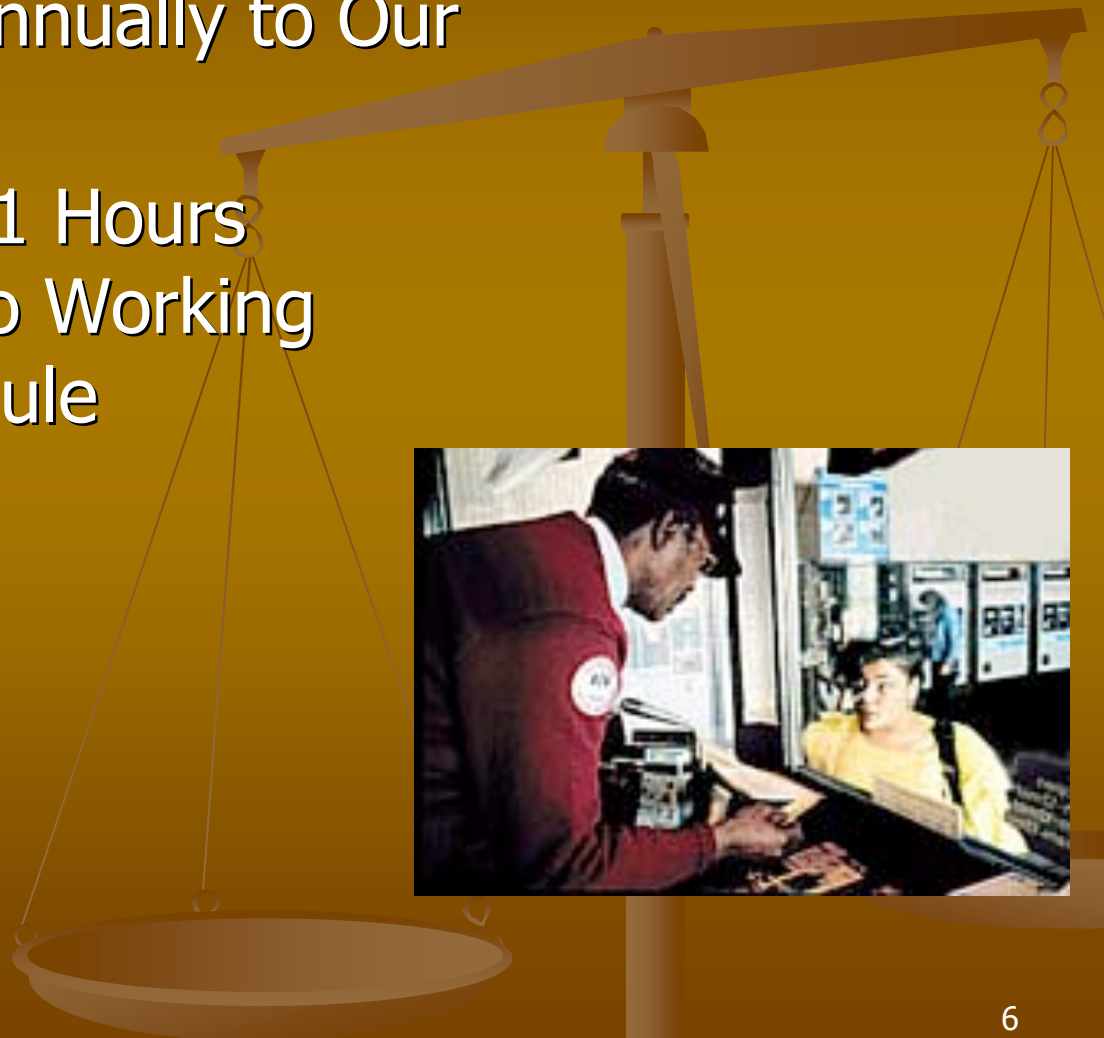
Who Pays the Costs?



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Where Are We Now?

- In the Past 20 Years: 158 Hours Added Annually to Our Schedule
- Since 1969: 241 Hours Added Yearly to Working Mothers' Schedule



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What is Fatigue?

- Fatigue Is a Complex State Characterized by a Lack of Alertness and Reduced Mental and Physical Performance, Often Accompanied by Drowsiness
- *Misconception:* Fatigue Is **Not** Just Falling Asleep.

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Fatigue Signs and Symptoms

- Forgetfulness
- Poor Communication
- Impaired Decision - Making Skills
- Lack of Alertness
- Slow Reaction Time
- Microsleep.



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Fatigue Signs and Symptoms (cont'd)

- Withdrawn Behavior
- Depressed
- Moody
- Quick to Anger
- No Sense of Humor
- Lack of Interest
- Always Tired.



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Factors That Affect Fatigue

- Time of Day/Circadian Effects
- Sleep Disorders
- Environmental Conditions
- Nutrition
- Physical Fitness
- Drugs
- Health
- Age.

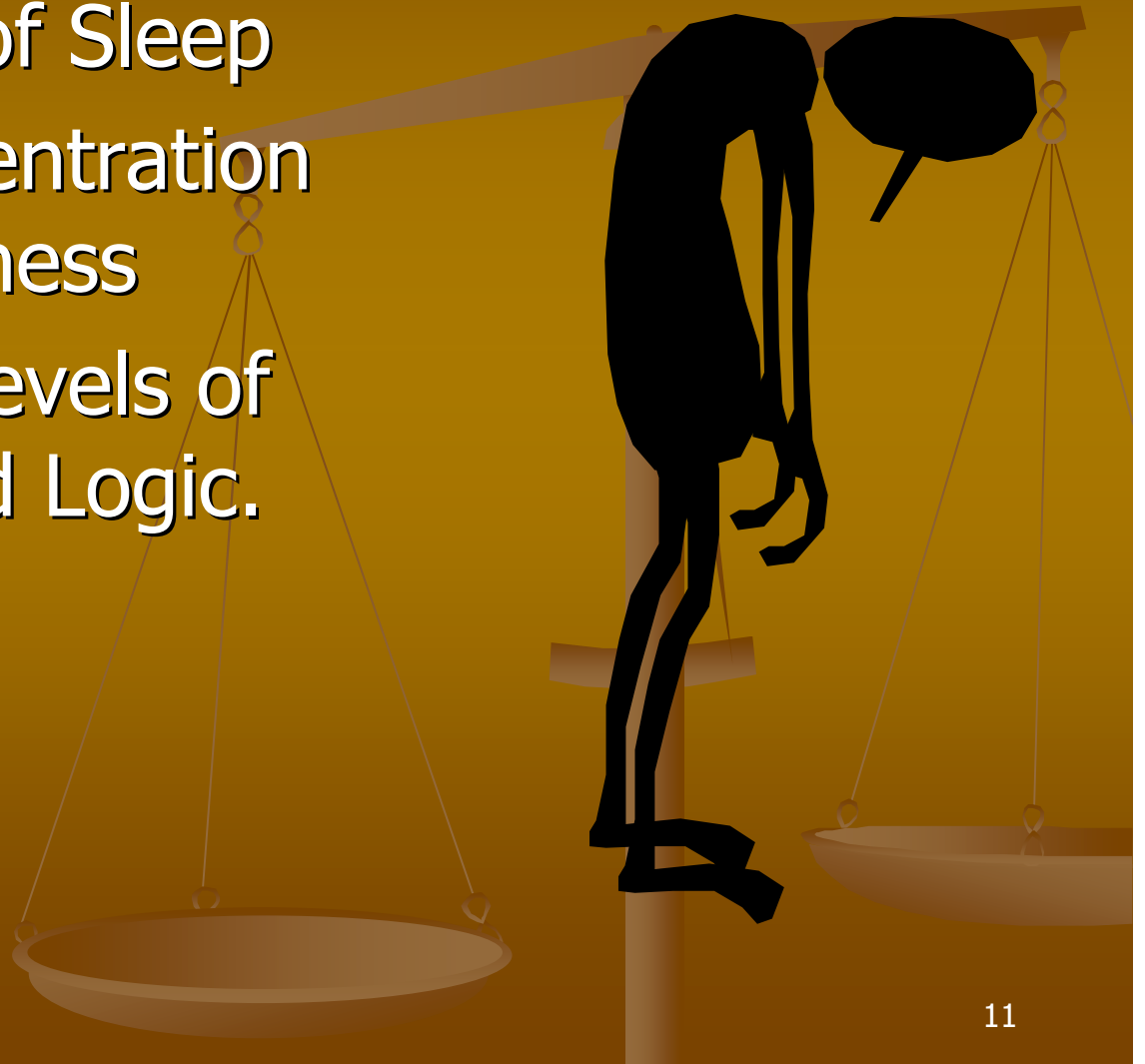
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Mental Fatigue

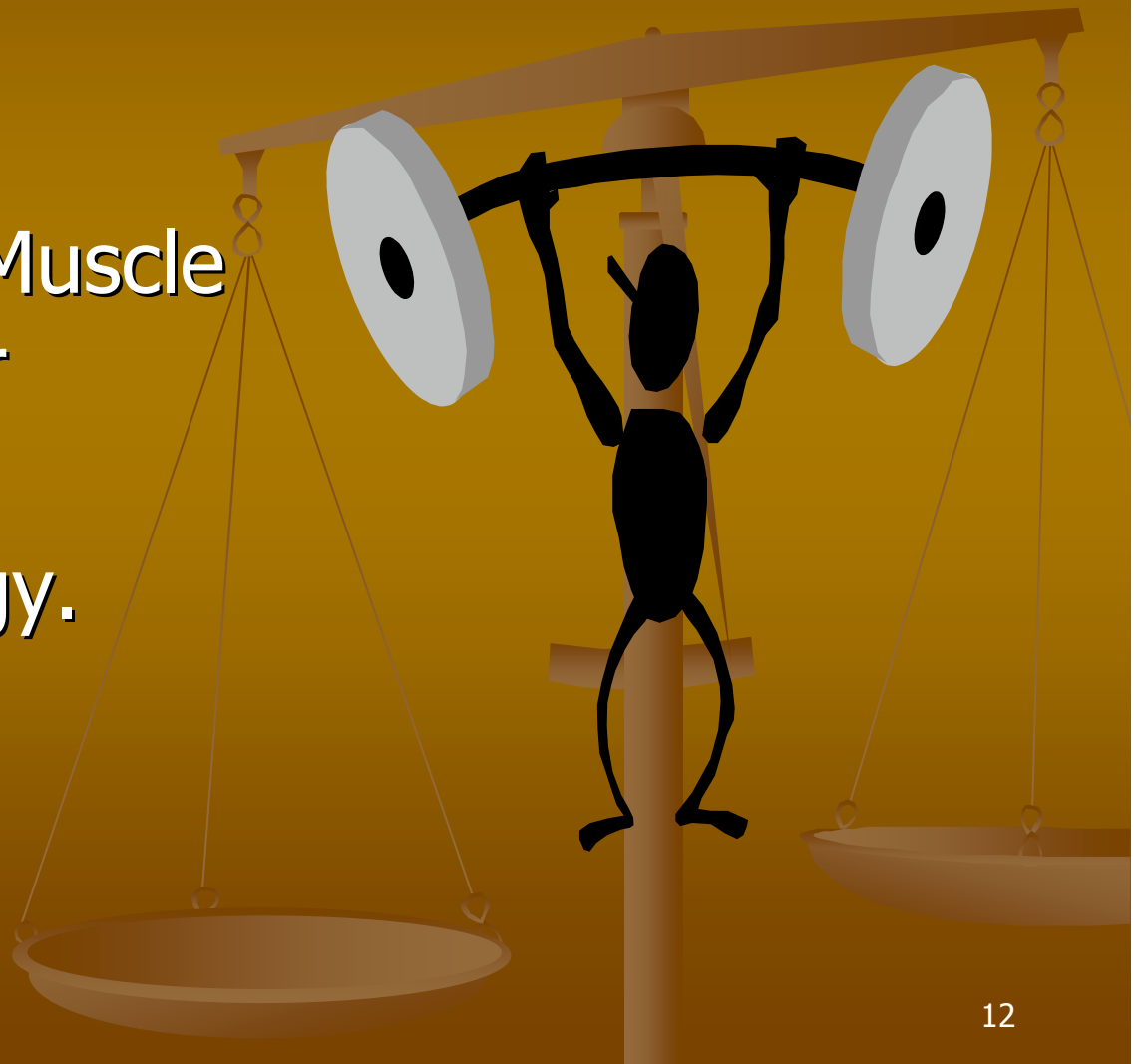
- Tired and Drowsy
Due to Loss of Sleep
- Loss of Concentration
And/Or Alertness
- Diminished Levels of
Creativity and Logic.

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Physical Fatigue

- A Decrease in Physical Performance
- A Feeling of Muscle Discomfort or Soreness
- Lack of Energy.



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SLEEP

- A Highly Complex Physiological Process During Which the Brain and Body Alternate Between Periods of Extreme Activity and Quiet, but Are Never Shut off.

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What Do We Know?

- Sleep Is a Vital Need
- One-third of Our Life ***SHOULD BE*** Spent Asleep
- The Average Person Needs at Least 8 Hours of Uninterrupted Sleep
- Some People Mistakenly Feel They Don't Need a Full Night's Sleep.

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Accumulating a Sleep Debt

- Sleep Loss Is Cumulative and Builds a Debt
- Most People Get 1 to 1.5 Hours Less Sleep Per Night Than They Need
- People whose sleep was restricted to 4 to 5 hours per night for one week needed two full nights sleep to recover vigilance, performance, and normal mood
 - How Do You Get Out of Sleep Debt?
SLEEP!.

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The Two States of Sleep

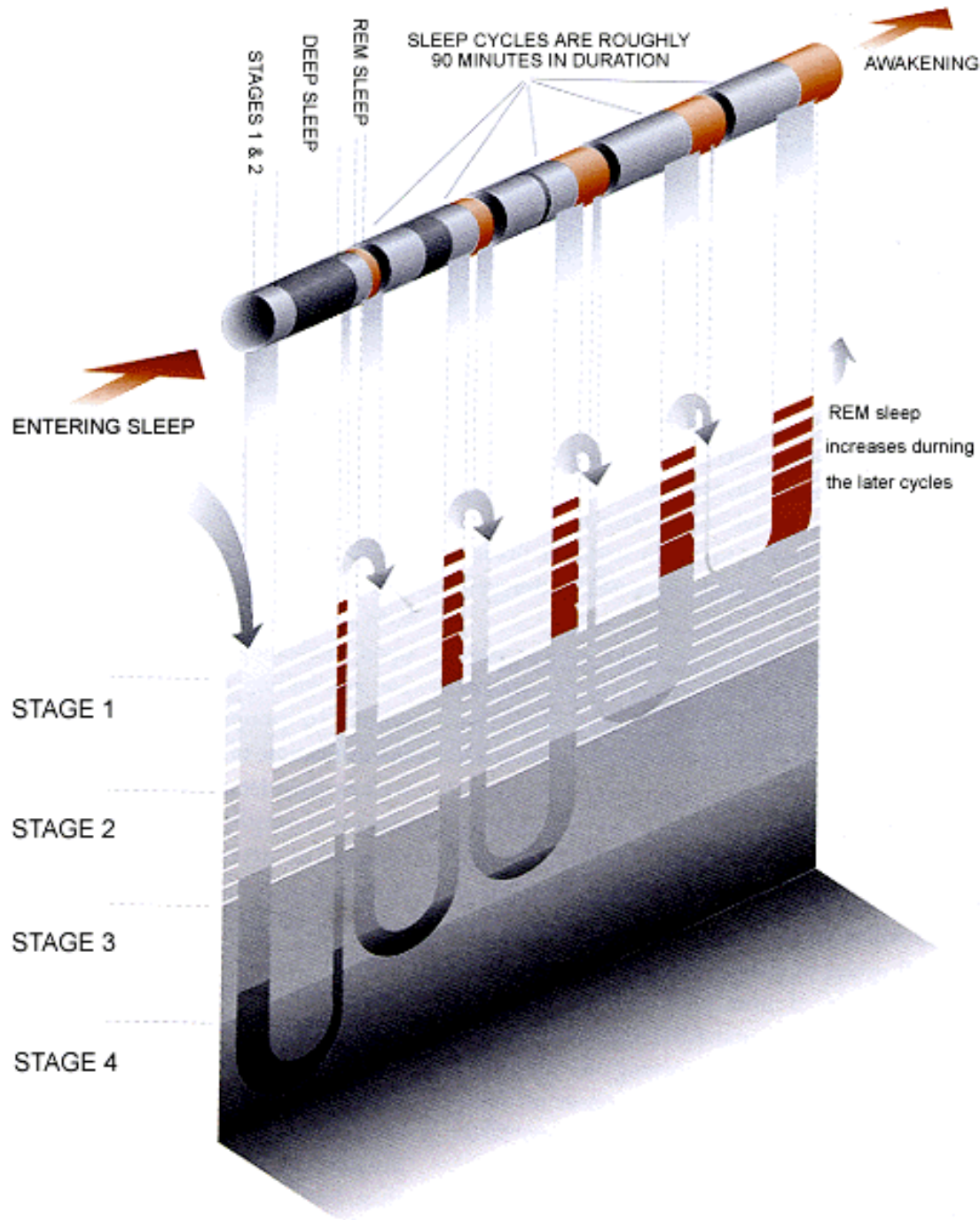
State I

- Non-REM Sleep
 - Physical and Mental Activities Slow
 - Physical Restoration Occurs

State II

- REM: Rapid Eye Movement
 - Extreme Mental Activity
 - Mental Restoration
 - Major Muscles Are Paralyzed

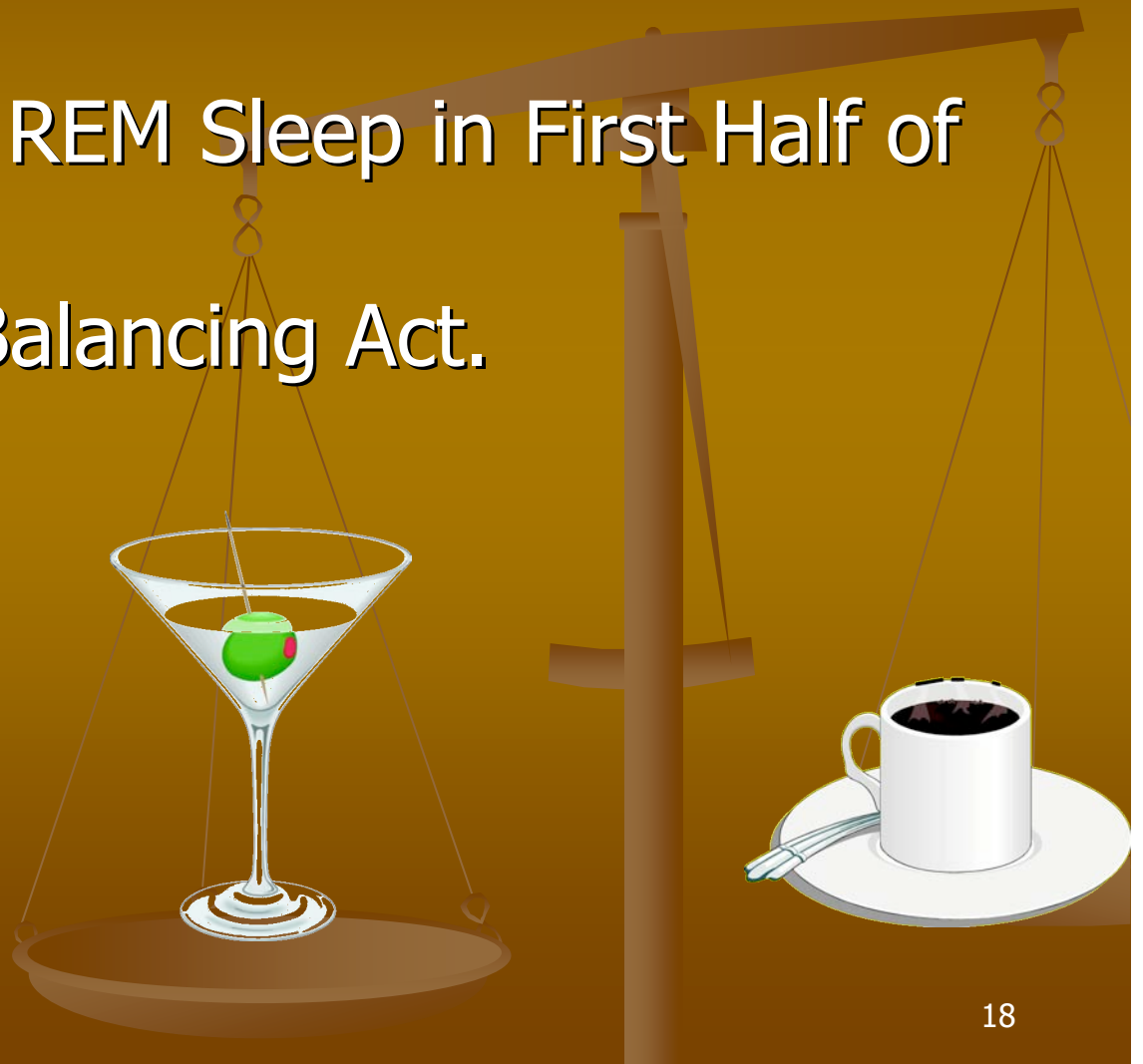
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States and Stages of Sleep

Effects of Alcohol on Sleep

- Breaks Down Into Sugar and Will Disrupt Sleep
- Eliminates All REM Sleep in First Half of Sleep Period
- Can Lead to Balancing Act.



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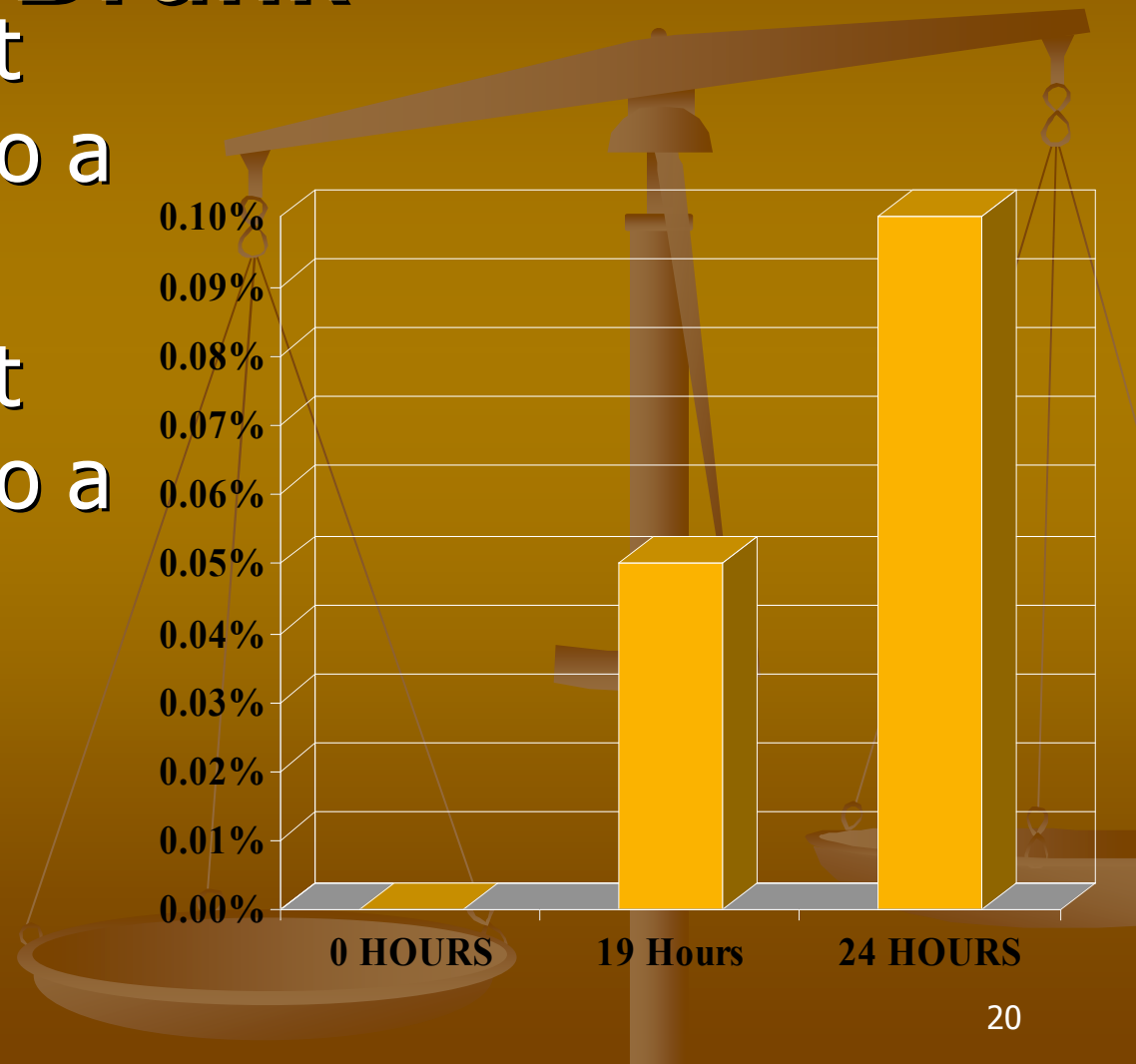
Sleep Disorders

- Chronic Insomnia
- Narcolepsy
- Sleep Apnea
- Restless Leg Syndrome
- Periodic Limb Movement Disorder.

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Driving Drowsy Affects Performance Like Driving Drunk

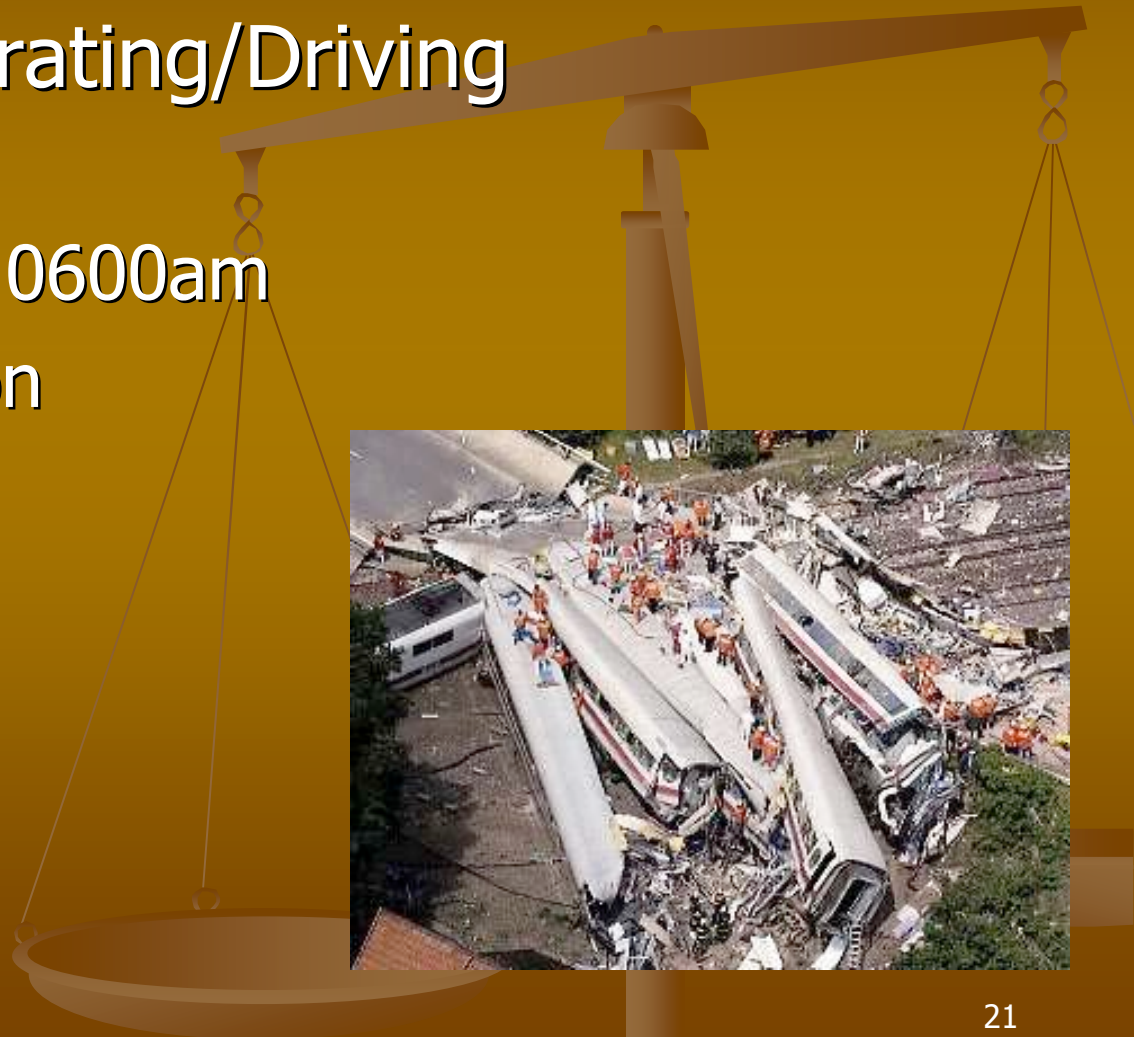
- 19 Hours Without Sleep Is Similar to a BAC of .05%
- 24 Hours Without Sleep Is Similar to a BAC of .10%.



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Who is Most at Risk?

- Sleep Loss
- Working/Operating/Driving Patterns
 - Midnight Till 0600am
 - Mid-afternoon
 - Many Miles
 - Many Hours
 - Monotony.



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Who is Most at Risk? (cont'd)

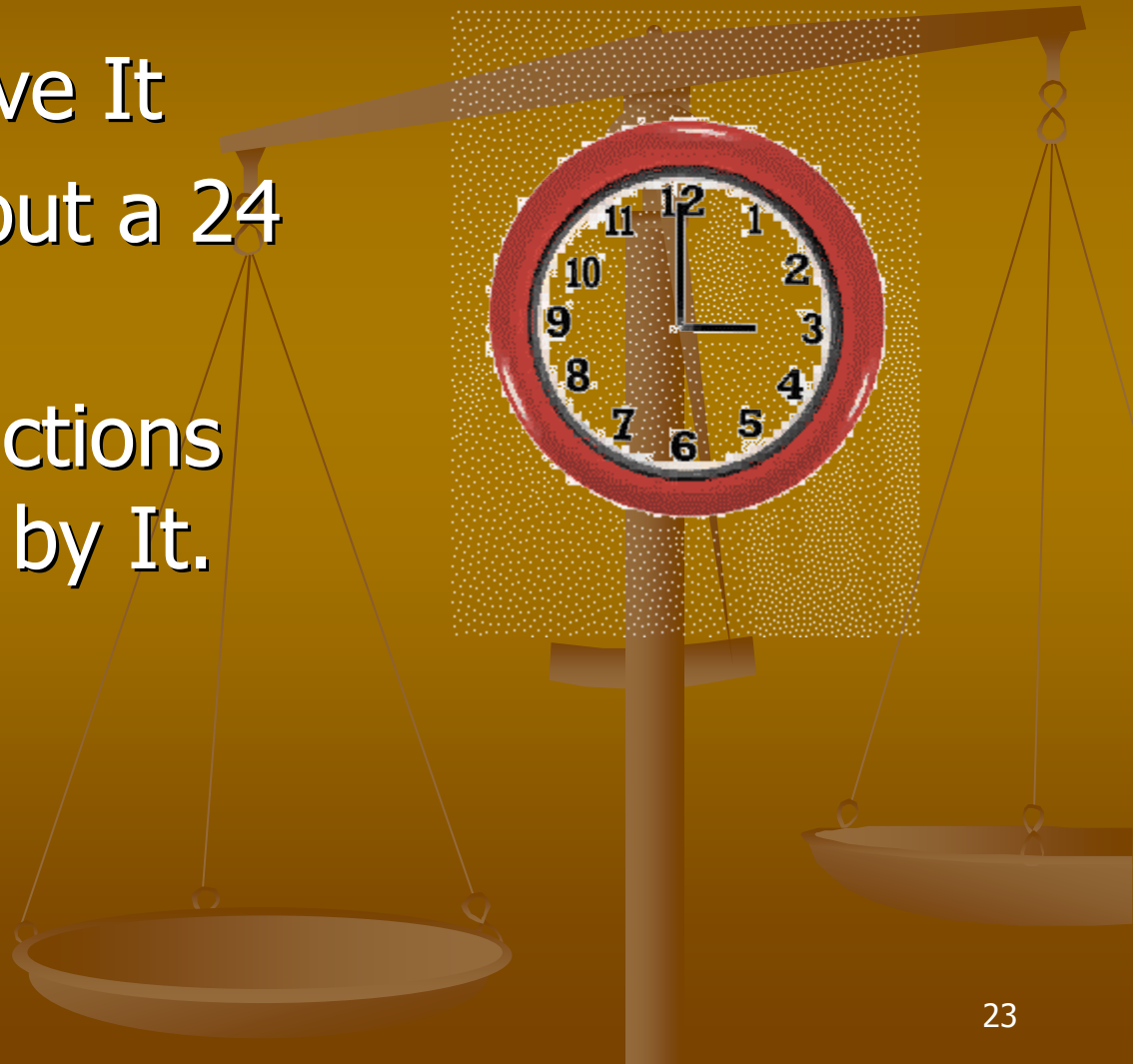
- Use of Sedating Medications
- Untreated Use of Sedating Medications
- Unrecognized Sleep Disorders
- Consumption of Alcohol.



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Internal Body Clock (Circadian Rhythms)

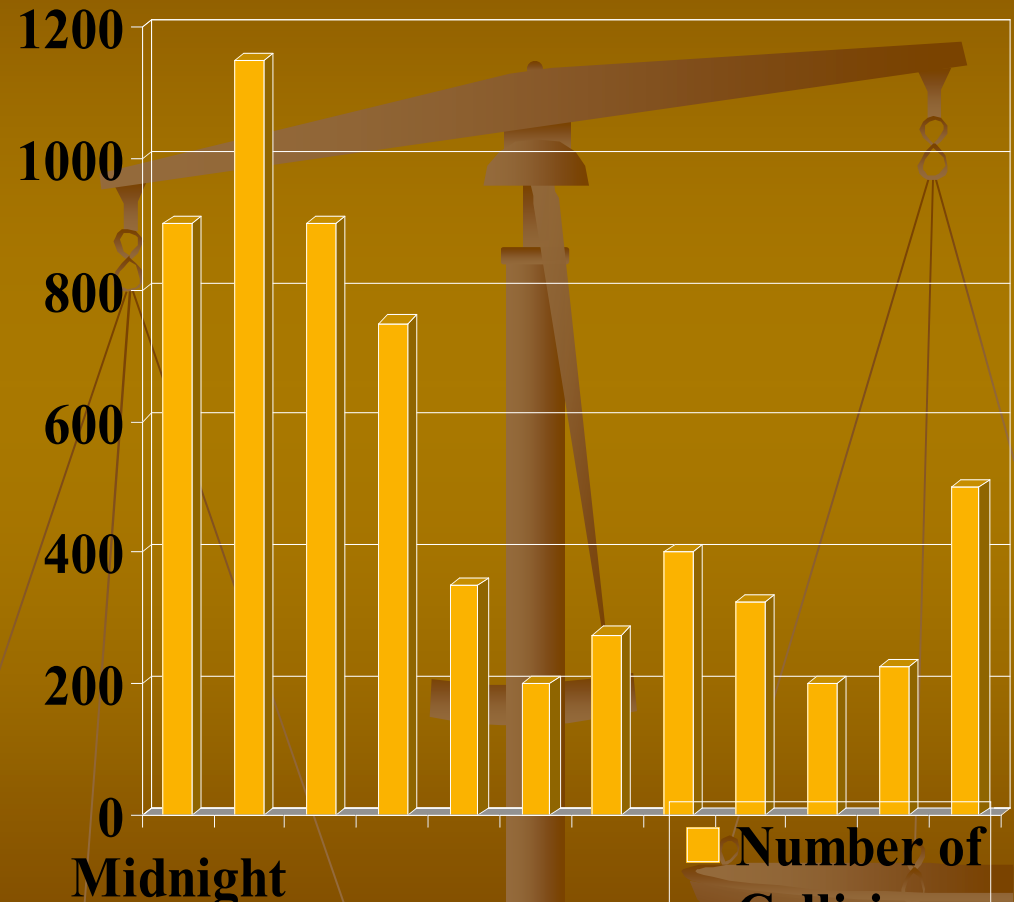
- All Animals Have It
- It Runs on About a 24 Hour Cycle
- All Human Functions Are Controlled by It.



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Daily Sleepiness and Performance Rhythms

- Two Times of Peak Sleepiness Each Day
 - About 3 to 5 A.M.
 - About 3 to 5 P.M.



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Biological and Social Effects on Shift Workers

- 60 to 80% Have Chronic Sleep Problems
- 4 to 5 Times More Likely to Have Stomach Disorders
- 80% Affected by Chronic Fatigue
- 5 to 15 Times More Likely to Suffer From Mood Swings and Depression
- Divorce and Spousal Abuse Rates Higher
- Drug and Alcohol Abuse Rates Higher.

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Incidents Related to Circadian Disruption

- Chernobyl
- Bhopal
- Three Mile Island
- Exxon Valdez

1:23am

12:40am

4:00am

12:04am.



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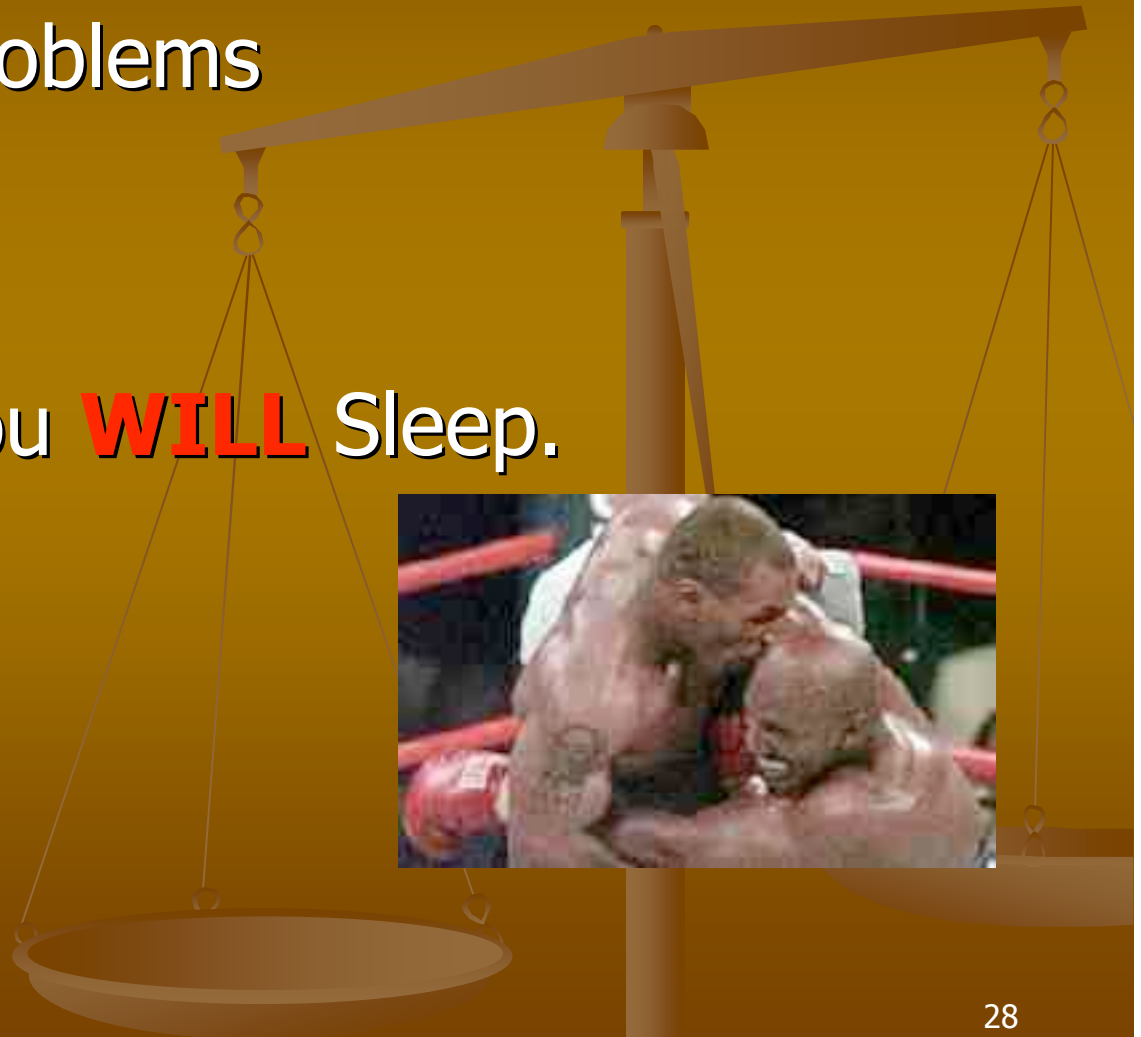
Incidents Related to Circadian Disruption (cont'd)

- Most Mistakes by Rail Employees 3-5am
- Most Mistakes by Omission 3-5am
 - Surgeons
 - Nurses
 - Postal Workers
 - Telephone Operators.

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What to Expect if You Don't Sleep

- Behavioral Problems
- Performance
- Mood Swings
- Eventually You **WILL** Sleep.



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What are the costs of fatigue?



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Where Do You Go to Find the Costs?

- Examine Crash Data, Incident Logs
- Review Workers' Compensation Claims, Sick Leave, and OSHA 300 Log For Data
- Review Overtime, or On-call Status.

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The Costs? (cont'd)

- Consider Fatigue As a Possible Contributing or Causal Factor in All Investigations
- Traffic, Industrial/Workplace, Internal, External Incidents: Review With Fatigue in Mind.



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What is your Company Policy?

- Overtime, On-call
- Outside Employment for Employees
- Prescription/Non-prescription Medication Policy
- Napping
- Technology.

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What is the Company Policy? (cont'd)

- Screening Employees for Sleep Disorders
- Employee Fatigue Awareness Training
- Corporate Culture:
 - Supervisor/Dispatcher/Employee Authority/Latitude to Confront Fatigue Issues
 - Priority of Safety Concerns.

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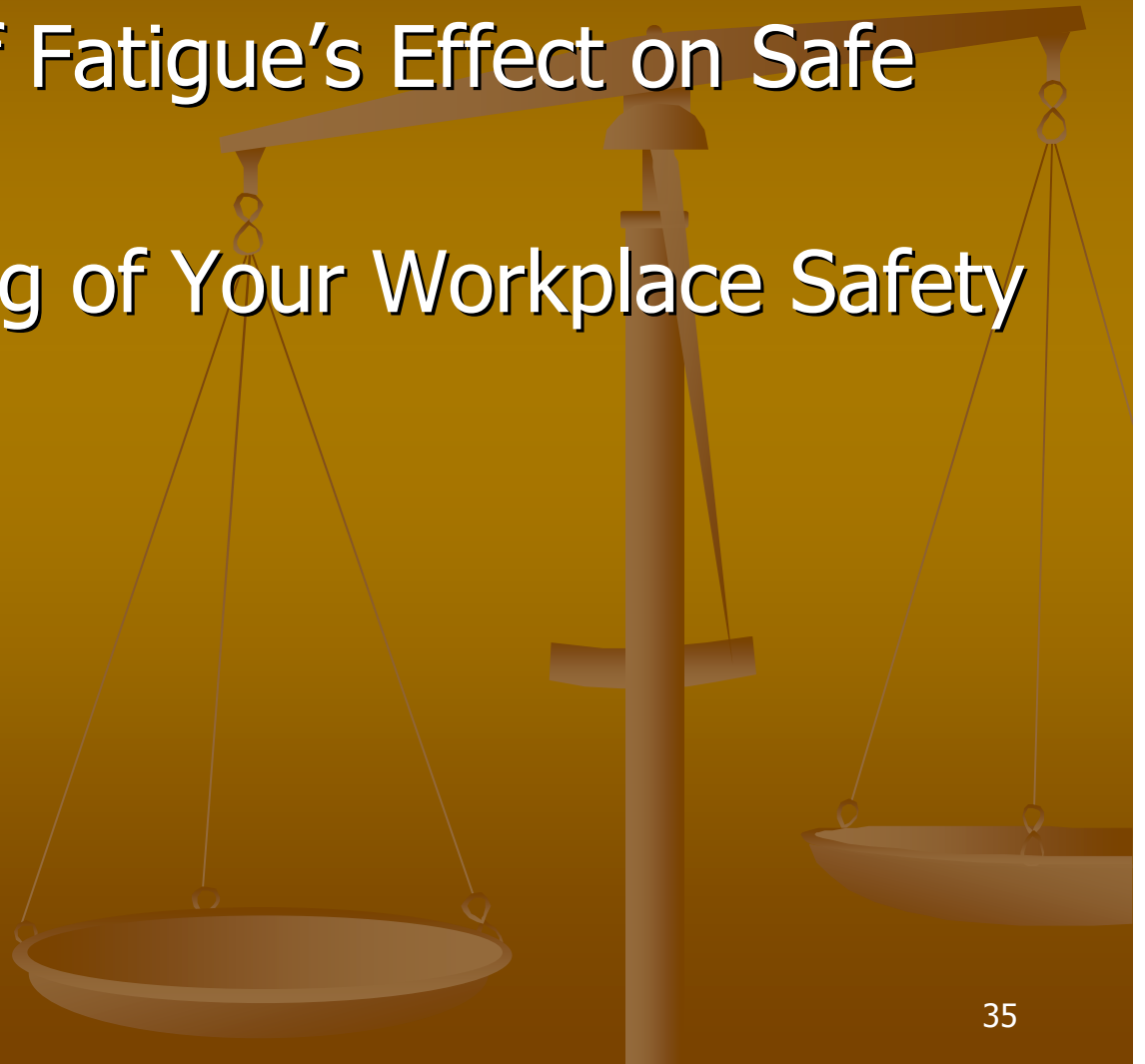
Supervision of Employees

- Are You Empowered to Approach Management With Fatigue Issues in the Workplace?.

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Keys to Change

- Knowledge of Fatigue
- Awareness of Fatigue's Effect on Safe Operations
- Understanding of Your Workplace Safety Culture.



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