

# AIGA 2008 MEETING

## Product Vehicle Safety & Accident Prevention



Asia Industrial  
Gases Association



FMM MIGMA

Co-organiser:

FMM Malaysian Industrial Gases Manufacturers Group

# Fatigue Management

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Transportation Working Group  
Team “B” (Thailand)



2008 Meeting



AIR LIQUIDE



# Team members

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Air Liquide	Vera Jarunguna	VJ
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# Introduction

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- Why study truck driver fatigue?
- How serious is the problem?
- How can we manage this issue?

# Accident caused by Fatigue





# Accident caused by Fatigue



# Accident caused by Fatigue

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# Accident caused by Fatigue





# Accident caused by Fatigue

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# Accident caused by Fatigue

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# THINK YOU CAN DO THE JOB WITH YOUR EYES CLOSED?



**Tiredness Kills. Make time for a break.**  
[www.thinkroadwatch.gov.uk](http://www.thinkroadwatch.gov.uk)

**THINK**

# Objective and Goal

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- Define fatigue : causes and impact
- Correct the myths about fatigue
- Identify the implications of types of sleep, the body clock and sleep recovery on managing fatigue
- Identify the best strategies for managing fatigue
- Guideline for Supervisors and Drivers

Improving Driving Safety throughout Asian Countries



# What Fatigue?

Fatigue is the body's response to continued physical or mental activity or sleep loss, characterized by:

## Feelings

- ✓ Tired—sleepy
- ✓ Apathetic—don't care
- ✓ Lethargic—can't be bothered
- ✓ Irritable—grouchy

## Performance

- ✓ Impair Judgment
- ✓ Forgetful
- ✓ Slower reactions
- ✓ Slower, muddled thinking
- ✓ Harder to pay attention

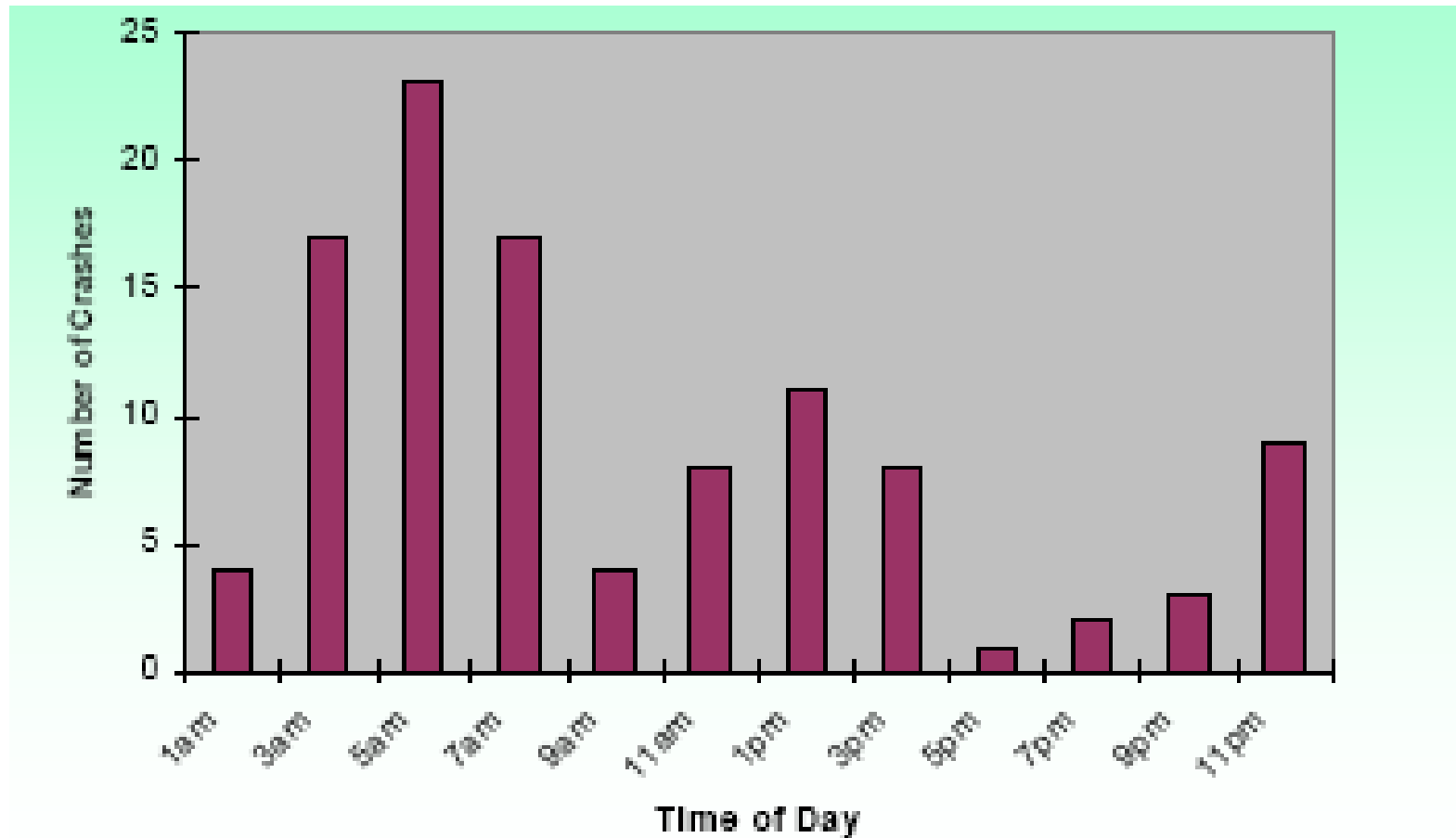
Fatigue is *not* hours of service; fatigue is *not* simply falling asleep.

# *Impact of Fatigue*

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- Accident, injury and/or loss of life
- ~ 20% motorists have fallen asleep at least once
- 10-20% of night workers fall asleep on shift
- Night drivers feel sleepier, drive slowly and erratically, and have slowed brain activity
- Dozing, night drivers are 7 times more likely to have an accidents than during the day

# Impact of Fatigue (continued)



# Impact of Fatigue (continued)



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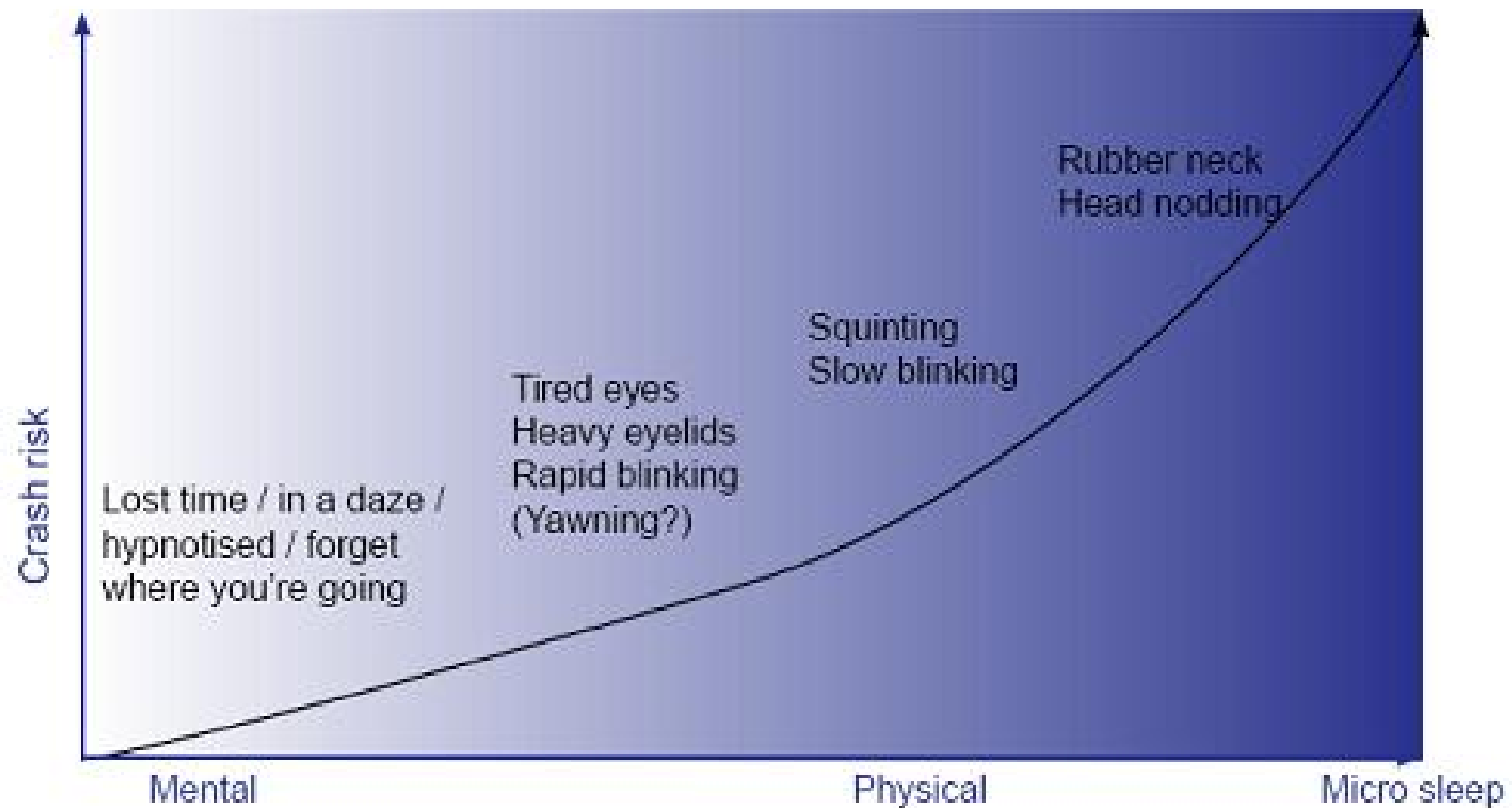
[www.youtube.com/watch?v=j1670yikz2E](http://www.youtube.com/watch?v=j1670yikz2E)

for the video clip. This was a public advertisement clip made by the Victoria (Australia) Traffic Accident Commission in 1994.



# Fatigue Curve

The 'Fatigue Curve'



# What Causes Fatigue?

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## Job Demands

- ✓ Workload and breaks
- ✓ Shift duration
- ✓ Type of work

## Human Biology

- ✓ Sleep
- ✓ Body clock
- ✓ Health, weight, eye sight, age

## Work Organization

- ✓ Trip scheduling
- ✓ Work predictability
- ✓ Pay system

## Life Outside Work

- ✓ Family and friends
- ✓ Commuting
- ✓ Standard of living

# Myths & Common Misconceptions about Fatigue

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- Alcohol helps sleep
- “Motivation and experience prevent me from falling asleep”
- “I know when I will fall asleep, and I can stop myself”
- “I’ve lost sleep before and I did just fine.”
- “There is a ‘magic bullet’ for fatigue.”
- “One cure will work for everybody.”

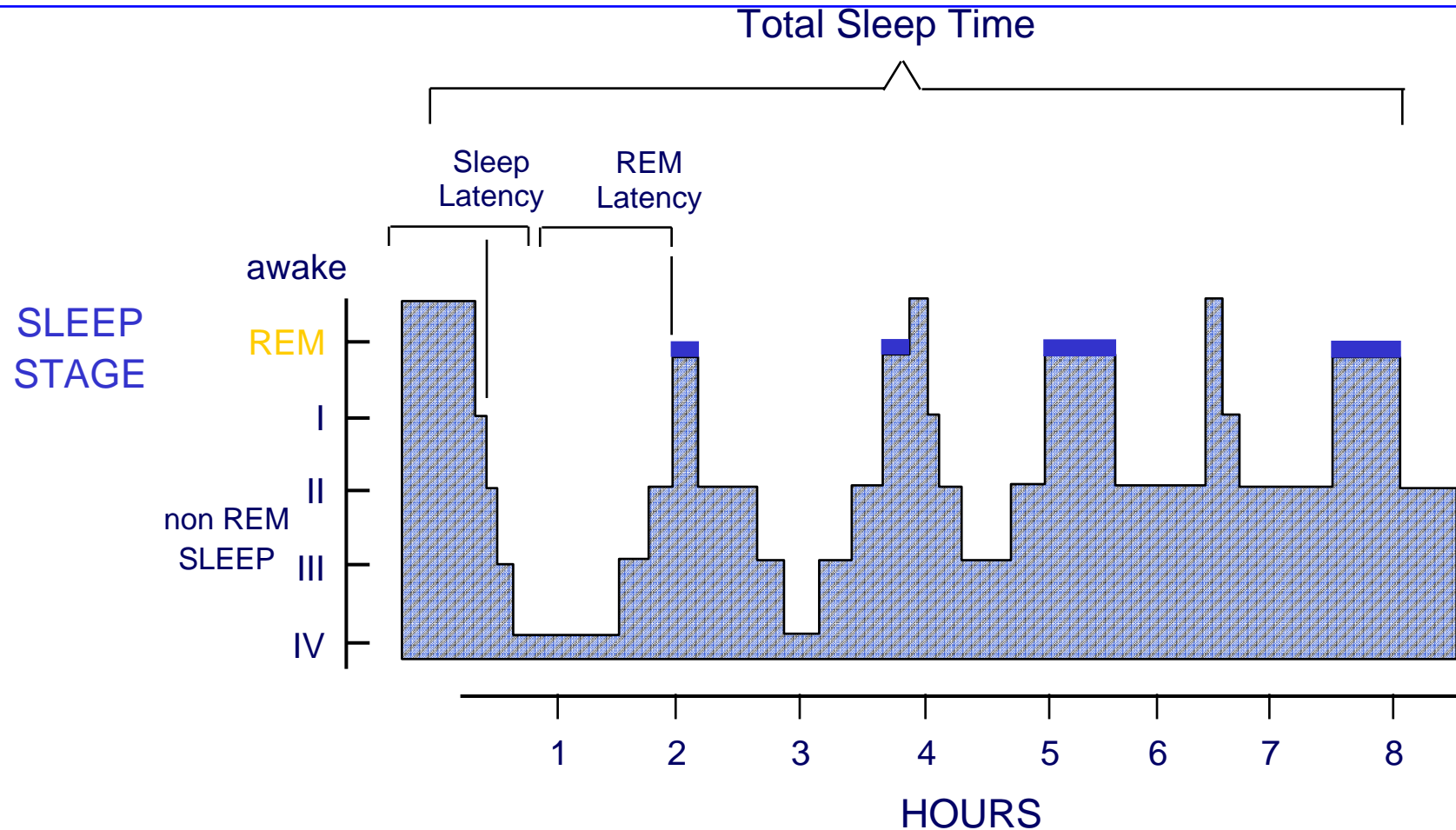
# Sleep

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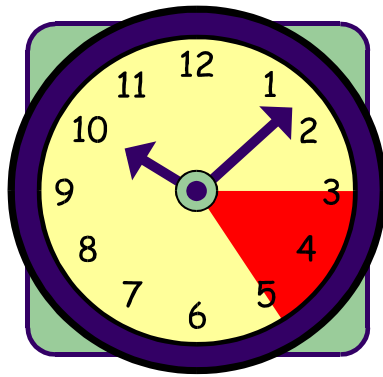
- REM (Rapid Eye Movement) Sleep
  - Brainwaves move quickly with eyes darting under lids
  - Vivid dreams but cannot move voluntarily
- Non-REM Sleep
  - Less brain activity, deep sleep
  - Sleep inertia



# Idealized Sequence of Sleep Stages In A Normal Young Adult



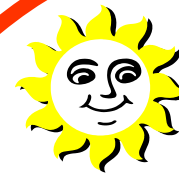
# The Biological Clock



**3 - 5 am**



- lowest core temperature
- maximum sleepiness
- poorest performance (mental and physical)



**3 - 5 pm**

- high sleepiness
- hard to stay vigilant

**The body's  
core temperature cycle**

# How much sleep is enough?

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- Sleep requirements vary with age, and there are differences among drivers -- some need more sleep than others.
- Most adults perform best with 7-8 hours of uninterrupted sleep.
- Eight 1-hour naps are *not* the equivalent of a full eight hours of sleep.

# Sleepiness

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- Major cause for sleepiness is insufficient sleep
  - Not enough sleep over a 3-4 day period
  - Too many waking hours in a 24-hour period
- 24-hours without sleep = blood alcohol 0.1%
- Good night's rest before long trip improves condition the next day
- Use of medicines with warnings about sleepiness increase risk of falling asleep at the wheel
- Naps are more beneficial than rolling down windows, turning up radio, singing/talking to yourself



# Sleep Loss and Sleep Debt

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- Missed sleep or sleep loss is additive, and results in cumulative “sleep debt.”
- Sleepiness results in decreased physical and mental performance
- We pay off sleep debt *only* by sleeping
- Sleep debt requires “recovery sleep,” which is not a one-for-one replacement for missed sleep
- Two nights of uninterrupted sleep is needed for full recovery from “sleep debt”

# Rest and sleep

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- *Rest* and *sleep* are not the same
- *Rest* is a break or even a simple change of activity from a fatiguing task; we remain awake
- Rest can restore energy, but it *cannot* substitute for sleep, nor can lack of sleep be corrected simply by resting
- Sleep allows both body and brain to recuperate, to be restored and refreshed

# Sleep Disorder

- Sleep apnea
- Narcolepsy
- Insomnia
- Restless leg syndrome (RLS)
  - Study shows that fewer people seem to have it in Asia.

## Obstructive Sleep Apnea



# Sleep and Trucking Operations

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- Hours of work (Circadian body clock)
  - Definition of working hour : On duty & Off duty
  - Rest and sleep hour
  - Scheduling
  - Change shift procedure
  - Best practices and/or recommendation
- Management control of working hour
- Illness and/or drugs and medications
- Personal lifestyle and/or family issue
  - Accommodation
- Effects from environment
- Customer condition

# Managing Fatigue

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- Preventive strategies: Before duty and on layovers
- Operational strategies: What to do while on duty to stay awake and alert?
- Everyone is different
- Identify the best strategies for managing fatigue
- Naps
- Warning signs of Fatigue
- Aids to sleep: Sleeping pills, cold/fever medication
- Diet
- Exercise : During on/off duty exercise

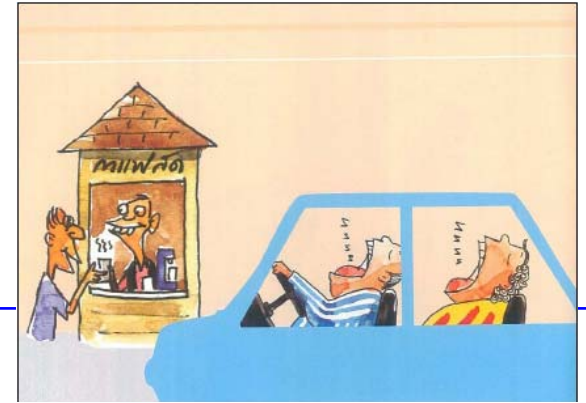


# Preventive Strategies

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- At home: get the best sleep possible before starting a trip
- On a trip: try to get at least as much sleep as in a day at home
- Get your sleep at the right times (at low circadian times)
- Don't forget physical fitness and nutrition
- Trust your own physiology: If you *feel* sleepy, it is because you *are* sleepy
- If you can't get to sleep within 15-30 minutes, get up and try again later
- Avoid long drives after work, especially if home is a long distance from the terminal
- Sleeping after the night shift

# Strategic Napping



- Help even if you don't feel great
- Short naps (less than 40 minutes) avoid sleep inertia
- Drink a cup (or 2) of coffee or a high caffeine drink then take a short nap to allow time for the caffeine to kick in
- Longer naps (90 minutes) allow time for 1 or 2 REM/non-REM cycles
- Plan to nap at safe rest stops during long hauls. *Be sure you are over sleep inertia before resuming your drive*

# While you are driving . . .

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- Engage in conversation (passengers, etc...), listen to talk radio
- Stay active; stretch your muscles
- Stop for frequent rest or exercise breaks
- Open the side window for fresh air
- Don't smoke: nicotine is not an effective stimulant, smoke makes us drowsy

# Warning Signs of Fatigue

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- Loss of concentration.
- Slower reaction times.
- Not remembering driving the last few miles or wandering across the road.
- Nodding off at the wheel (micro sleeps).
- Poor signalling.
- Paying less attention to traffic.
- Continuously yawning.
- Eyes becoming sore or tired, starting to lose focus or dimmed vision.
- Many car overtaking without notice
- Can not remember warning sign that just pass

# Warning Signs of Fatigue (continued)

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- Painful limbs, stiffness and/or cramps
- Tailgating
- Change lane without reason
- Difficult to maintain speed
- Apply brake without reason
- Lane straddling
- Jerking the wheel to stay in lane
- Drive on road shoulder without notice
- Shifting in your seat
- Open window to get fresh air

Note : When you have these warning signs, STOP!! at the nearest safe parking area and do not fight drowsiness by trying to gain a few more miles otherwise you will never reach your destination alive!!



# Guideline for Drivers

- Training and communication
- Fit for duty
- Warning signs of fatigue
- Driver's obligations
  - Stop if feeling sleepy and take a power nap
  - Obtain sufficient high quality sleep between periods of driving
  - Avoid alcohol
  - Get enough sleep when off-duty !



# Guideline for Supervisor/Management

- Hours of work (Circadian body clock)
  - Definition of working hour : On duty & Off duty
  - Rest and sleep hour
  - Scheduling
  - Change shift procedure
  - Best practices and/or recommendation
- Training and communication
- Pre-tour testing
  - Observe driver's condition
  - Two ways communication to make sure driver is well and enough sleep
- Management control of working hour
- Customer condition

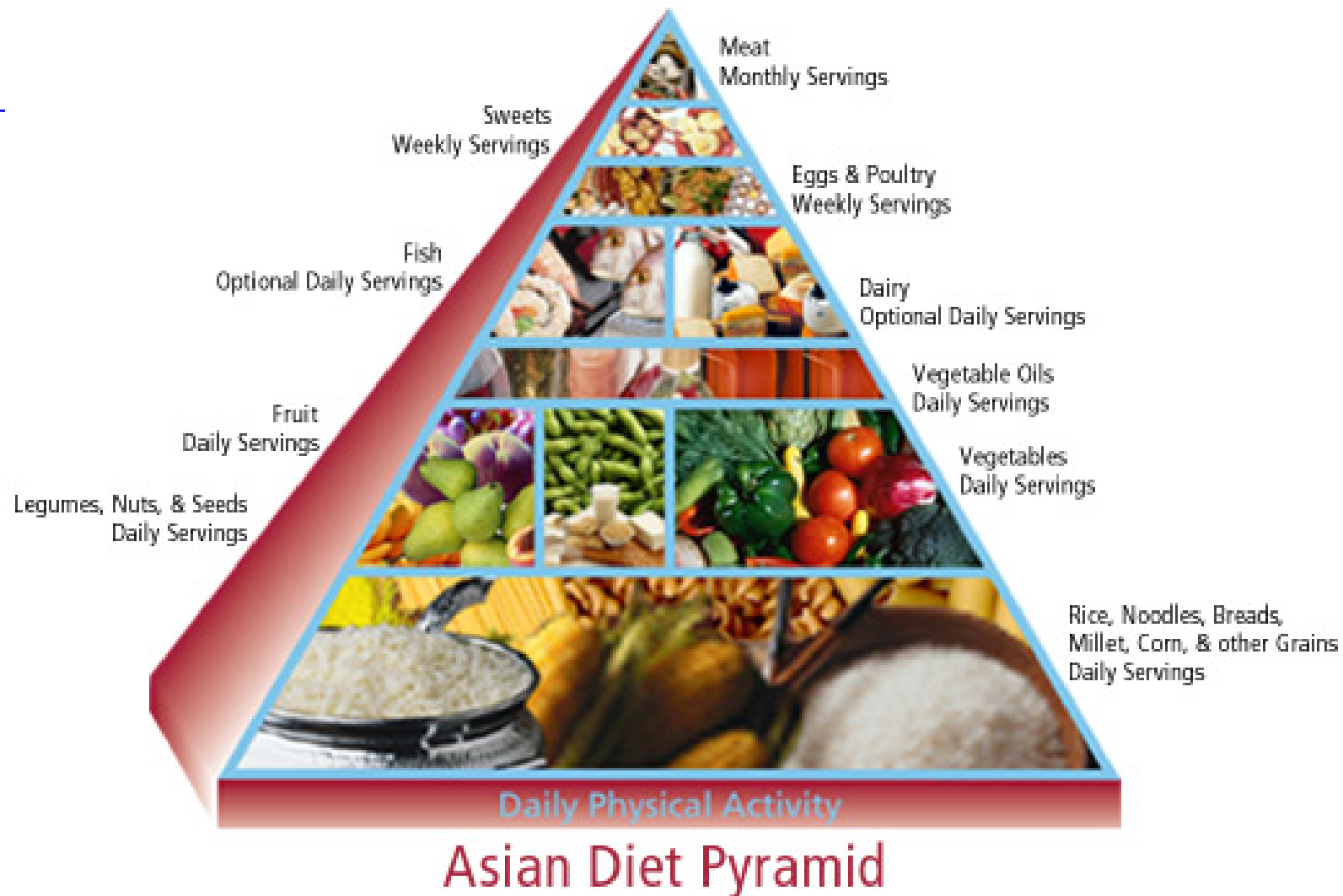


# Diet and Performance

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- High fat meals : Feel sleepy and fatigued
- Heavy, bed-time meals : Restless night
- Foods with simple sugars : Quick high of energy; tired and hungry later

# Diet Pyramid : Asian



# Benefits of Exercise

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- Strengthens the body and increase flexibility
- Increases energy levels and endurance
- Improves alertness
- Reduces risk of heart disease

**Remember : Strenuous exercise right before bed can interfere with sleep!**

# Benefits of Exercise (continued)

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- Helps control weight
- Improves blood cholesterol and blood pressure levels
- Prevents bone loss
- Manages stress

**Warning : Always consult a physician before beginning any exercise program!**



# Driver Fatigue Quiz

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This is a quiz to determine how much people know about sleep and sleep debt.

1. Coffee overcomes the effects of drowsiness while driving. (T or F)
2. I can tell when I'm going to go to sleep. (T or F)
3. Rolling down my window or singing along with the radio will keep me awake. (T or F)
4. I'm a safe driver so it doesn't matter if I'm sleepy. (T or F)
5. You can stockpile sleep on the weekends. (T or F)
6. Most adults need at least seven hours of sleep each night. (T or F)
7. Being sleepy makes you misperceive things. (T or F)
8. Young people need less sleep. (T or F)
9. Wandering, disconnected thoughts are a warning sign of driver fatigue. (T or F)
10. Little green men in the middle of the road may mean the driver is too tired to drive. (T or F)
11. On a long trip, the driver should never take a break but try to arrive at the destination as quickly as possible. (T or F)
12. A micro sleep lasts four or five seconds. (T or F)

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**Any Question?  
&  
Thank You**



*2008 Meeting*



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