

# FIRE COACH, REASONS AND HUMAN CONSEQUENCES.

**BUSWORLD TURKEY APRIL 2014.**



BOTTO Patrick  
French expert  
Coach and bus safety.

# FIRE COACH, REASONS AND HUMAN CONSEQUENCES.

- In the world, serious coach accident occur but remain low.

Among them fire coaches and buses.



A Swedish study estimated that 1% of coaches worldwide catch fire each year.

# FIRE COACH, REASONS AND HUMAN CONSEQUENCES.

- For this presentation, our sample is 92 fire coaches and buses.
- On a recent period and in all countries of our planet.
- On the road, the coach is the vehicle that has the highest level of safety ten times that of the car.



# FIRE COACH, REASONS AND HUMAN CONSEQUENCES.

- The main causes of fire for coaches.

- terrorist attacks.(security)
- vandalism and volunteers depredations.(security)
- after an accident.(safety)
- spontaneous fire.(safety)

This study analyzes only the last two causes. (accidents and spontaneous coach fire)

# FIRE COACH, REASONS AND HUMAN CONSEQUENCES.

- In our sample of 92 fires coach :

- 14% of cases occur after an accident.

With a large number of fatalities and serious injuries.

- 86% of cases are spontaneous fire.

With only slightly injured.

# FIRE COACH, REASONS AND HUMAN CONSEQUENCES.

- As a first step, we look at the cases of coach fire occurred after an accident.



## First example:

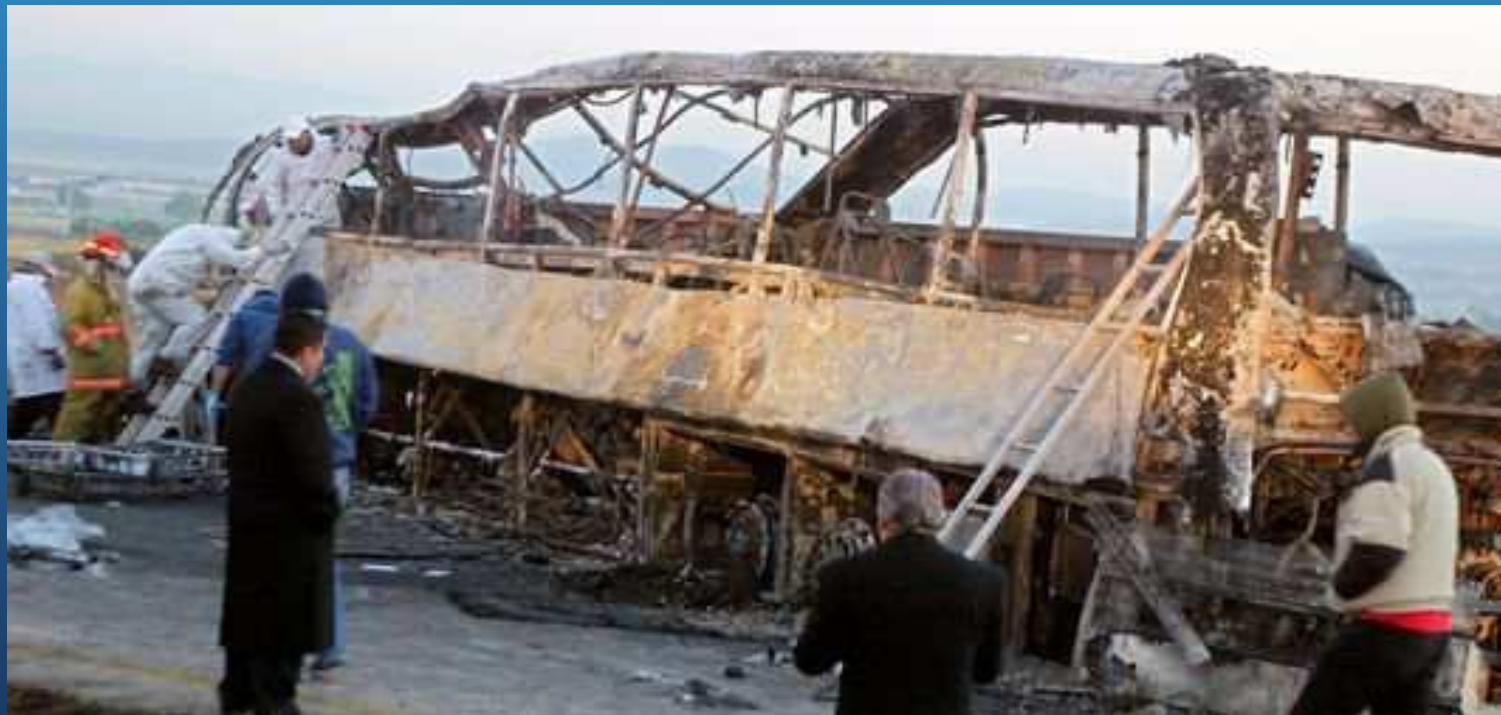
Coach Accident with fire  
Accident in China near Beijing  
october 3 2012.

6 fatalities and 14 seriously  
injured.



# FIRE COACH, REASONS AND HUMAN CONSEQUENCES.

- Coach accident with fire ; October 18, 2010
- Accident in Mexico and northern Mexico City
- collision with a truck ; 18 fatalities



# FIRE COACH, REASONS AND HUMAN CONSEQUENCES.



- Coach accident with fire
- Accident near Bangalore in India
- Impact against a fixed obstacle.
- October 30, 2013
- 44 fatalities.



# FIRE COACH, REASONS AND HUMAN CONSEQUENCES.

- Coach Crash with fire, collision between two coaches.
- Accident in Iran, between Tehran and Qom, in september 09 2013.
- 62 fatalities.



# FIRE COACH, REASONS AND HUMAN CONSEQUENCES.



- Coach Crash with fire , collision between a coach and a truck.
- Accident in China's Shaanxi Province. August 26, 2012.
- 36 fatalities.

# FIRE COACH, REASONS AND HUMAN CONSEQUENCES.

- Coach Crash with fire , collision between a coach and a truck.
- Accident in the northeast of Thailand, July 23, 2013 and 19 fatalities.



# FIRE COACH, REASONS AND HUMAN CONSEQUENCES.

- During a coach fire after an accident, medical and human cost is often extremely serious and severe.
- After a coach accident, the occurrence of a fire is a particularly dangerous agravant factor.

# FIRE COACH, REASONS AND HUMAN CONSEQUENCES.

- As a second step, we look at the cases of spontaneous fire coach.
- Our focus is the origins of these spontaneous coaches fires.
  - In the engine compartment: 56% of cases.
  - Origin other than in the engine compartment: 24% of cases.
  - unknown information: 20% of cases.



# FIRE COACH, REASONS AND HUMAN CONSEQUENCES.

- The main sources of fire inside the engine compartment.
  - Projection of very hot oil or fuel inside the turbo compressor. *This mechanism is the main cause of spontaneous fires coach.*
  - Hose leak oil or fuel into the engine compartment.



# FIRE COACH, REASONS AND HUMAN CONSEQUENCES.

- The main sources of fire outside of the engine compartment.
  - Electric short circuits. (heating, ventilation, dashboard ...)
  - Heating of a axles, brakes malfunction, or during a burst tire.



# FIRE COACH, REASONS AND HUMAN CONSEQUENCES.

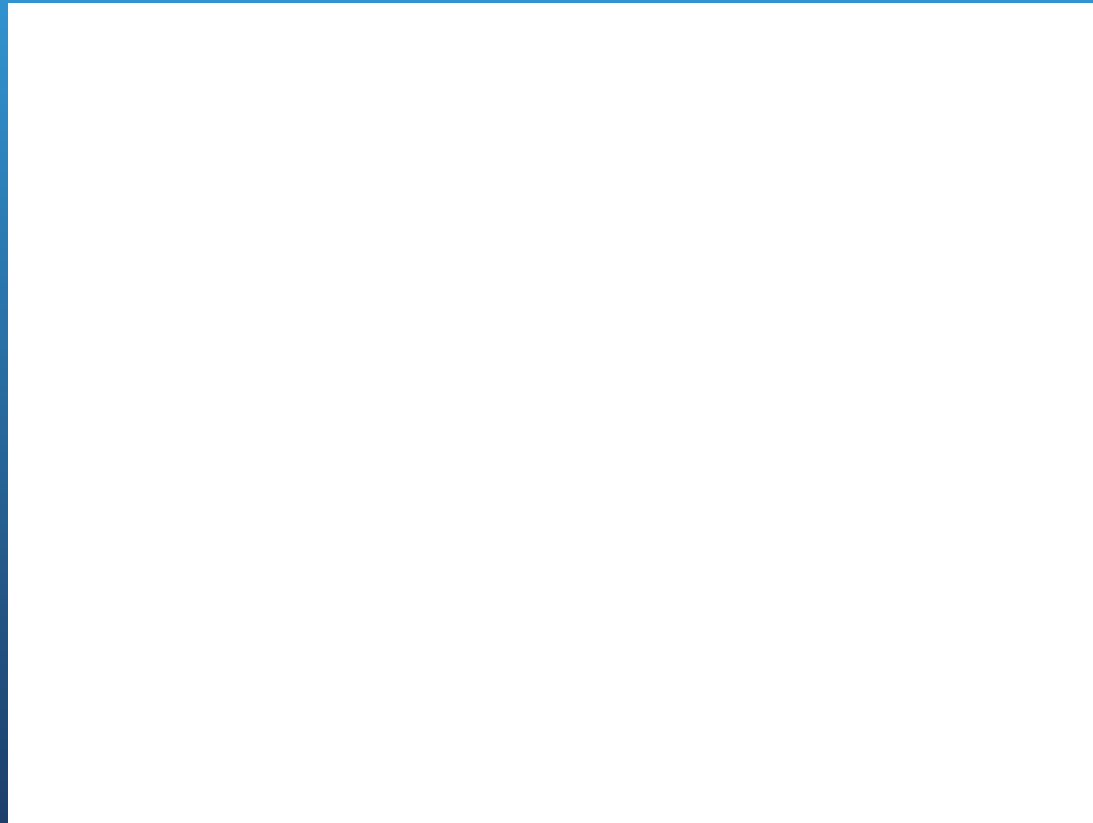
- Human and health consequences of these spontaneous fires coach.
  - A very small number of victims.
  - Only light injuries, slightly intoxicated.



Coach fire in Turkey.

# FIRE COACH, REASONS AND HUMAN CONSEQUENCES.

- Example of a spontaneous coach fire without any occupant when the fire starts.



# FIRE COACH, REASONS AND HUMAN CONSEQUENCES.

- New technologies and bus fire.
- Canada electric minibuses are prohibited traffic given the problems of overheating batteries causing fires.



# FIRE COACH, REASONS AND HUMAN CONSEQUENCES.

- CONCLUSIONS:

- Accident followed by a coach fire : very serious human cost.
- Spontaneous fire coach : very light human cost.

But a coach fire after an accident is still a major problem particularly serious.

# FIRE COACH, REASONS AND HUMAN CONSEQUENCES.

- CONCLUSIONS:

- The main countermeasures.

Automatic detection and extinction.

Increased insulation of the engine compartment.

Better fire resistance of materials.

Organize the fastest evacuation of passengers.



# FIRE COACH, REASONS AND HUMAN CONSEQUENCES.

- Thank you for your attention.