

# Occupant Protection- Passive Safety

**Automotive Crash Injury Prevention  
Research for India**

**8-9 March ,2018**

**Ramee Grand Hotel**

**Apte Road, Shivaji Nagar, Pune**

**Fees/Participant :**  
**₹ 25000.0 +**  
**Applicable Taxes**

“I invited Dr. Thorbole from the United States for the NATRIP Accident research workshop in New Delhi as one of the key speakers. His lecture on accident reconstruction and injury biomechanics for Indian roads to prevent injuries was very insightful and facilitated our several decisions”

**Pradeep Agarwal**  
Ex- NATRIP Director

“Dr. Chandra spent time with my group to understand the data collected & volunteered to perform a detailed injury analysis for couple of cases. The team felt quite motivated when they could experience the value they were adding for detailed accident data collection”

**V S Gogate**  
EX-Asst. General Manager  
Crash Safety, TATA Motors

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“The presentation and Dr. Thorbole were excellent. Crucial information for anyone in automotive passive safety research for injury prevention.”

**Sagar Bendre**  
Engineer, NATRAX/NATRIP

“Accident reconstruction and Injury biomechanics training was very insightful and played a crucial role in our occupant protection and passive safety research”

**Dhiraj Borse**  
Ex- Engineer, ERC  
Crash Safety & Accident  
Reconstruction  
TATA Motors

## Synopsis

This two-day seminar focuses on automotive passive safety and its influence on injury prevention exclusively in context to Indian conditions. Nonstop traffic accident research and analysis in the United States has improved vehicle passive safety over the years through implementing innovative engineering countermeasures. United States regulations and NCAP program enable the occupant protection performance evaluation and subsequent ranking of vehicles. IIHS research and testing further provides valuable insight regarding the vehicles passive safety performance and shortcomings that facilitates the development of new passive safety technologies.

This seminar covers all the topics enabling an engineer to brainstorm, design, develop and evaluate a new passive safety technology, protecting an occupant from crash induced impact and inertial loads. This seminar involves understanding the entire process, starting with the real-world crash data collection, analysis, and crash injury biomechanics. Occupant restraint performance and vehicle crashworthiness in different crash modes are discussed. Real world crashes will be presented in the context of injuries and failure of passive safety systems in protecting occupants demonstrating the need for improved new designs.

## Who can benefit?

This seminar is designed for everyone who is interested in understanding and knowing the broad area of automotive passive safety. Suitable for fresh engineering graduates who want to pursue a career in automotive technologies or automotive design engineers who want to excel their capabilities in occupant protection area. This seminar is an excellent choice for companies and organizations trying to set-up their accident research centers to learn real-world crashes to curb injuries and fatalities on Indian roads. Anyone who wants to apply knowledge gained from accidents to design and develop new passive safety device and schemes.

The logo for MORNSAN Technologies is located on the right side of the slide. It consists of a white circle with a blue border. Inside the circle, the word "MORNSAN" is written in white capital letters on a dark blue rectangular background. Below "MORNSAN", the word "Technologies" is written in a smaller, dark blue font.

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# Course Objective

The primary objective of this seminar is to acquaint crash safety engineers, with the entire process involved in design and development of a passive safety system. This workshop uses real-world crash injury analysis to understand the mentioned process.

## General Vehicle Occupant Crash Safety

- Active Safety
- Passive Safety

## Elements of Field Data Collection

- Epidemiology
- Scene/Site Investigations
- Vehicle inspections

## Forensic Injury Biomechanics

- Anatomy
- Human Tolerance
- Medical data/scans analysis
- Injury pattern
- Injury severity
- Injury kinematics & dynamics
- Injury mechanism analysis

## Crash Safety Performance Evaluation

- Mechanical Surrogates (Crash Dummies)
- Computer Simulations (MADYMO/LS-DYNA, Virtual Crash)
- NCAP crash tests
- Sled testing procedures

## Safety Regulations

- Minimum vehicle safety requirements
- Role of accident and injury analysis
- Current Indian Standards

## Vehicle Crashworthiness

- General crashworthiness
- Required crashworthy performance in a frontal crash
- Required crashworthy performance in a rollover crash
- Role of engineering materials in crashworthy designs
- Basic mechanics for crashworthy designs

## Vehicle Restraint System

- Seatbelt performance and crash biomechanics
- Seat design and crash biomechanics
- SRS performance
- Knee bolster and crash performance
- Pretensioners and Load limiters

## Real world crashes

- Frontal and Frontal Offset Crashes
- Rollover Crashes and Ejections
- Non-Horizontal Crashes



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# MORNSAN Technologies

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## Instructor

Dr. Thorbole is a road traffic injury consultant at the Thorbole Simulation Technologies, LLC based in the United States. He has over 15 years experience in Injury Biomechanics area, primarily dedicated to automotive crash injury causation analysis. His training and experience enable him to design and develop innovative passive safety systems or enhance the performance of existing one.

A frequent speaker at conferences and seminars, organized by automotive industry or related organizations, and author of numerous peer-reviewed technical articles focused on automotive crashworthiness and occupant protection.

Drawing on his vast experience in the field of crash injury analysis and prevention, he provides biomechanics, occupant protection and crashworthiness consulting and services to clients in the United States and India.

He has been granted two United States patents for automotive seatbelt buckle designs. He is the active member of ASB (American Society of Biomechanics), ASME (American Society of Mechanical Engineer's) and SAE (Society of Automotive Engineers).

**Dr. Thorbole is the owner and CTO of MORNSAN Technologies Pvt. Ltd. Situated in Pune Maharashtra**