



## **FEMFAT User Meeting 2013**

# **Truck Cab Mount Force Prediction for CAE Durability Evaluation**

16th. May 2013

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Hino Motors , Ltd.**

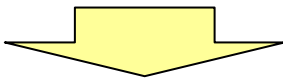
- 1. Background**
- 2. Technique for cabin force prediction**
- 3. Outline of CAE Model**
- 4. CAE Results**
- 5. Validation in the different mounting type**
- 6. Conclusion**
- 7. Future tasks**

# 1. Background

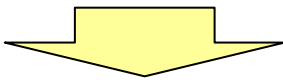
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Recently, the reliability of vehicle improvement and short-term development are demanded.

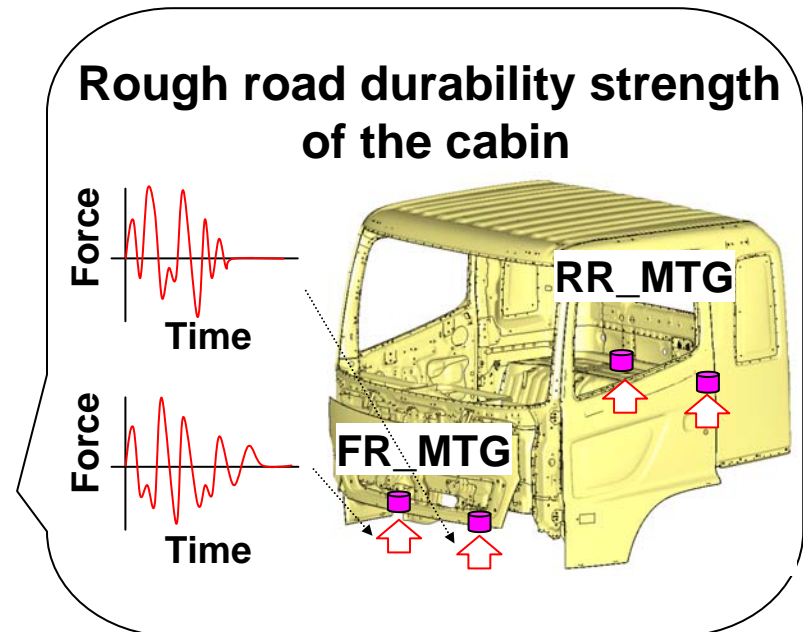
It is imperative to make determine vehicle structure before prototype cars.



High accuracy lifetime prediction by CAE is imperative



The reproducible cabin force of Experiment is imperative



**Objective** To establish technique to calculate the reproducible cabin force of experiment

# 1. Background

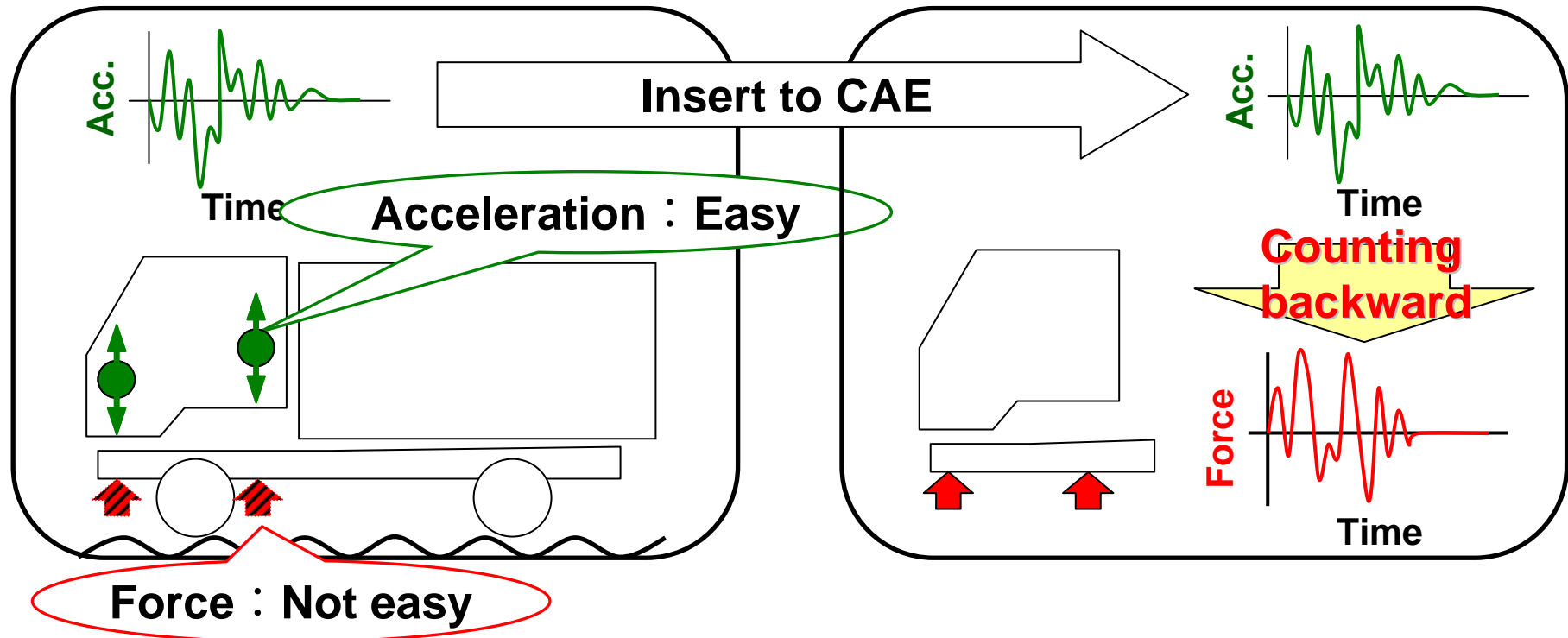
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## Calculation method

Counted it backward from actual survey and  
examined technique to predict cabin force  
⇒ FEMFAT LAB Virtual Iteration

Experiment  
(Rough road durability test)

CAE  
(Durability bench test)

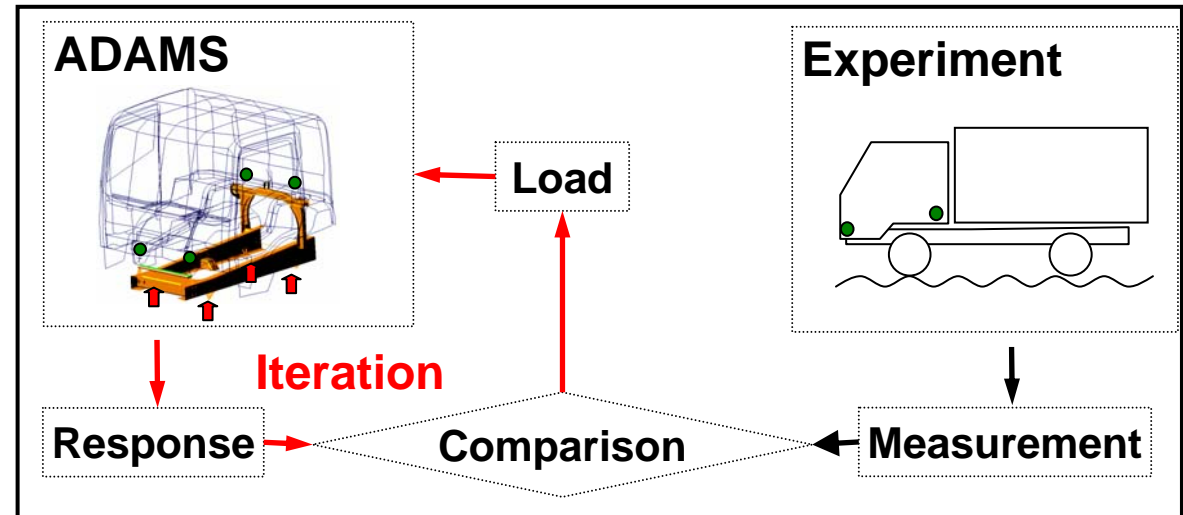


## 2. Technique for cabin force prediction (Overall flow)

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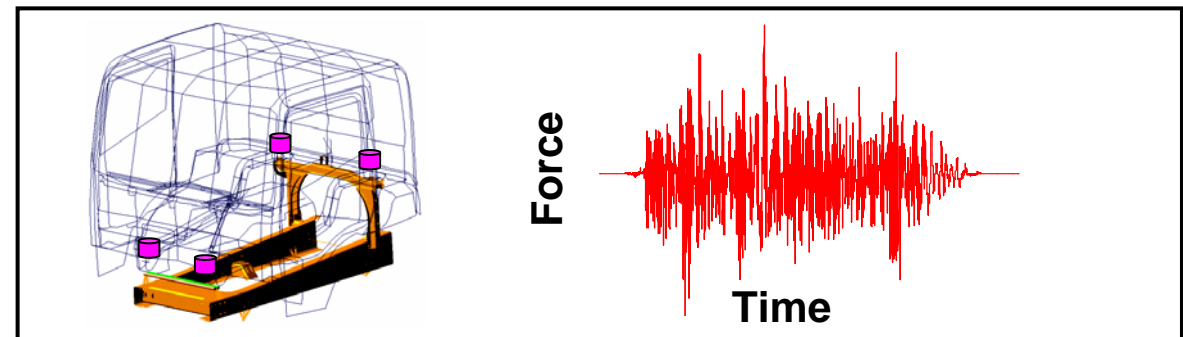
### ① Identification of Load Data

FEMFAT LAB (VI)



### ② Cabin Force Calculation

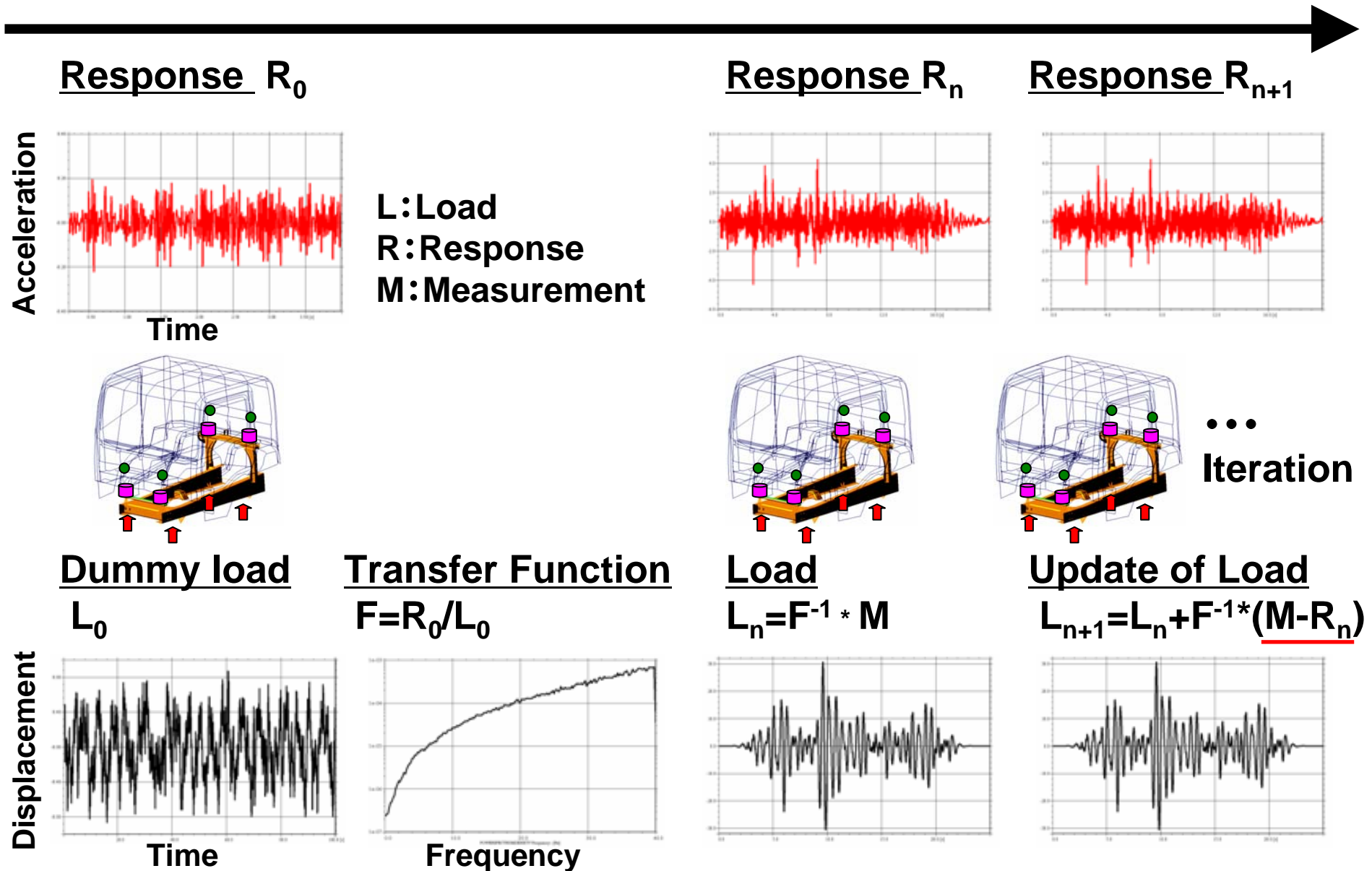
ADAMS



### ③ Lifetime Evaluation Analysis

FEMFAT

# 2. Technique for cabin force prediction (Identification of load data)



# 3. Outline of CAE Model

## Rigid type Mounting

<Cabin>

Elastic body model

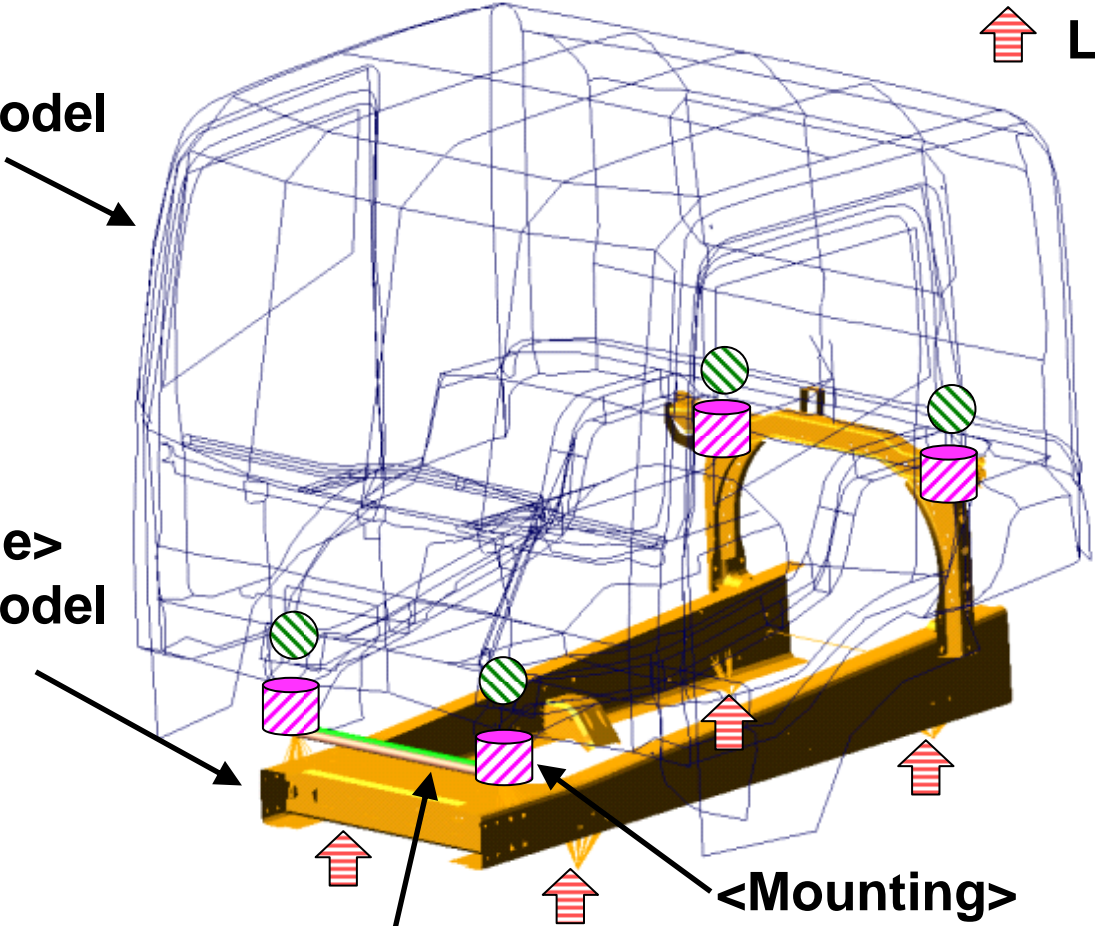
<Chassis Frame>

Elastic body model

<Torsion Bar for Cabin Tilting>

● Response Point

↑ Load Point

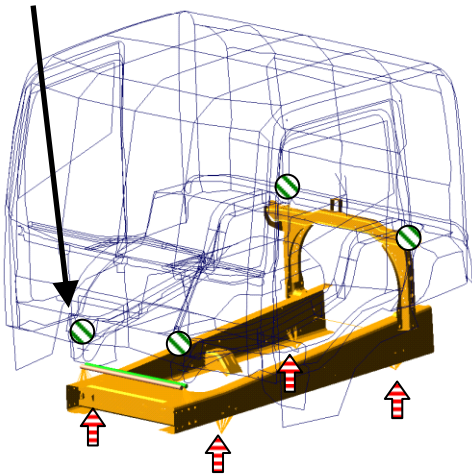


<Mounting>  
Spring model  
(Dynamic spring characteristic)

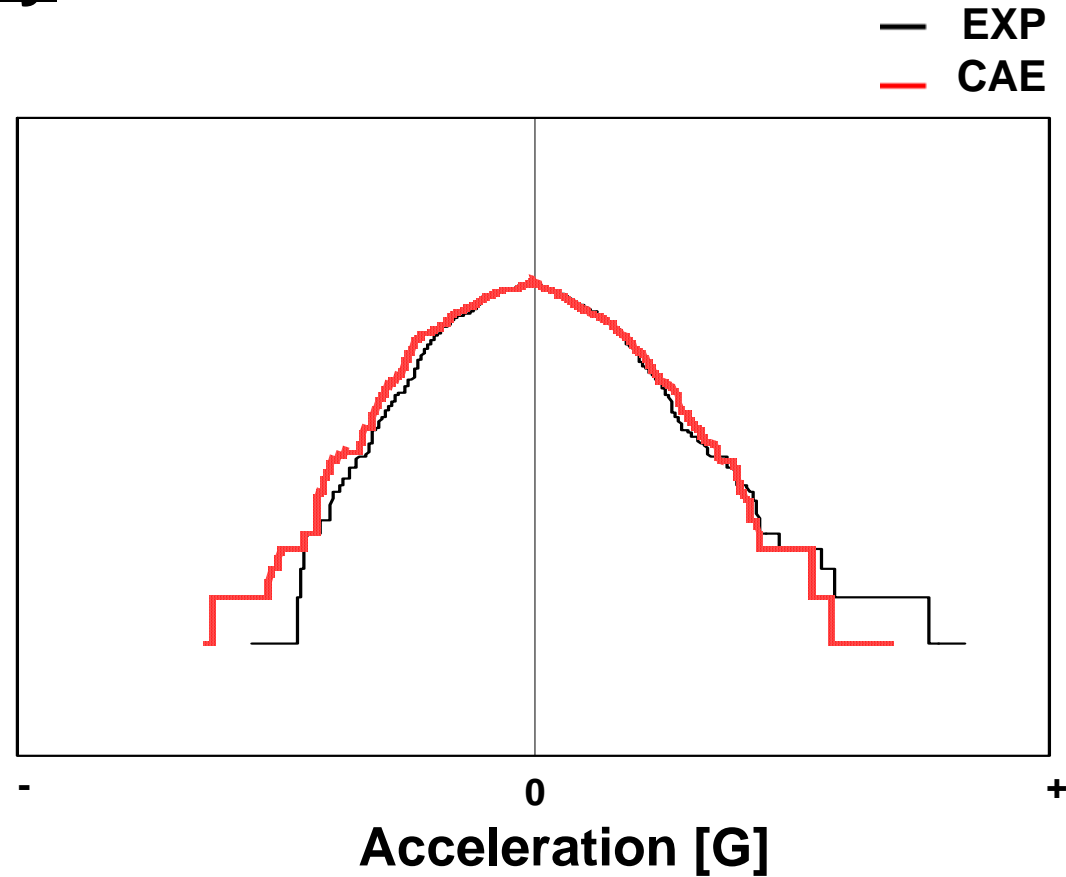
# 4. CAE Results

## Cumulative Frequency (Rigid Type)

Measurement Point



Cumulative Frequency  
[Count/Km]



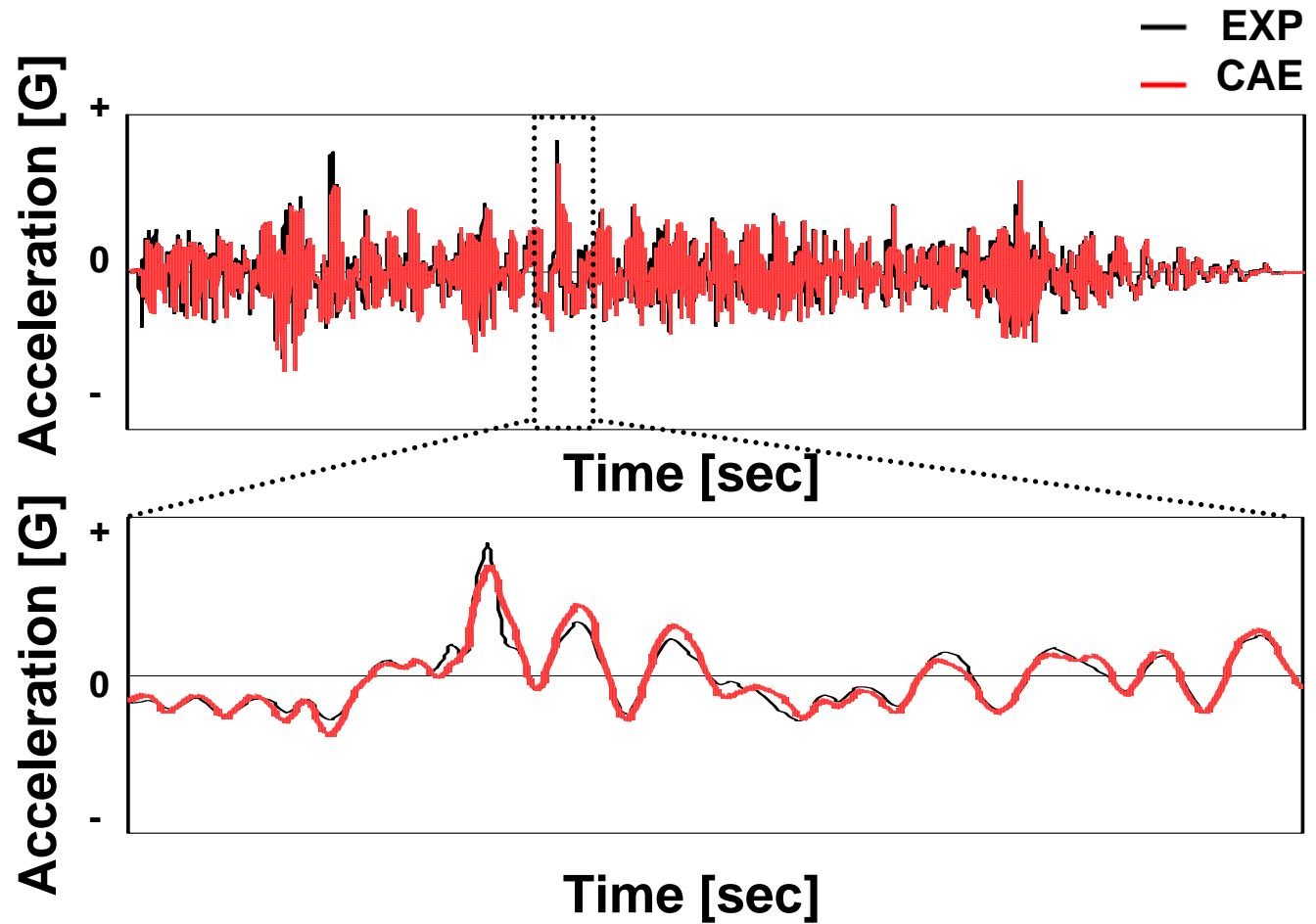
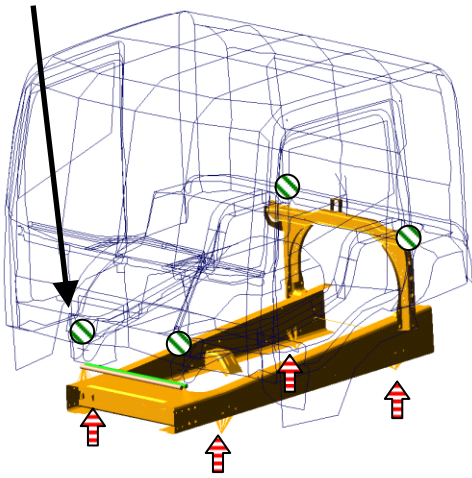
Cumulative frequency simulated experiment



# 4. CAE Results

## Time history (Rigid Type)

Measurement Point



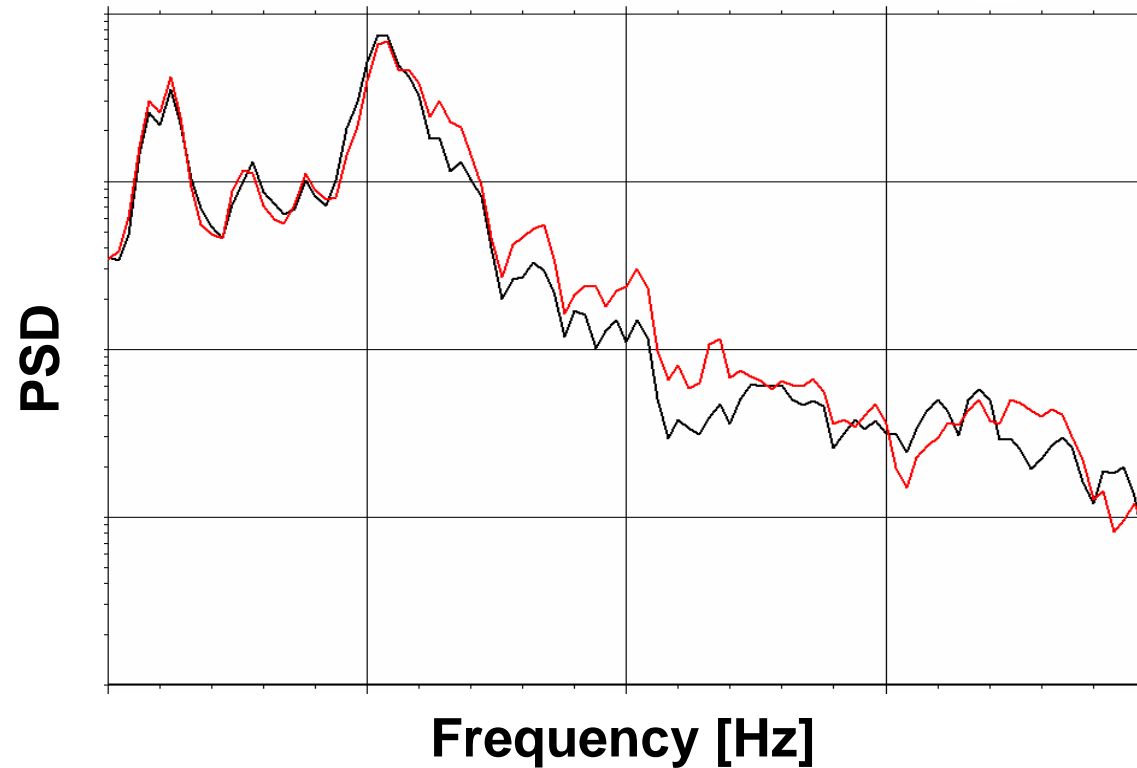
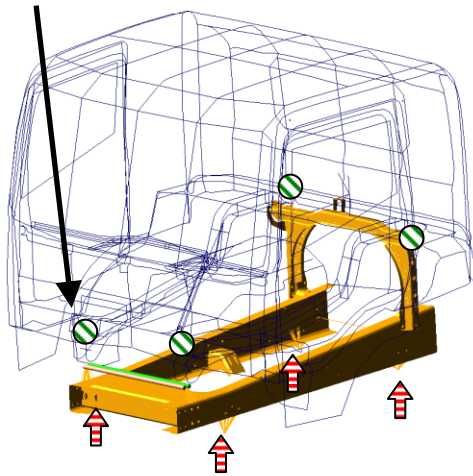
**Time history simulated experiment**

# 4. CAE Results

## Frequency response (Rigid Type)

— EXP  
— CAE

Measurement Point

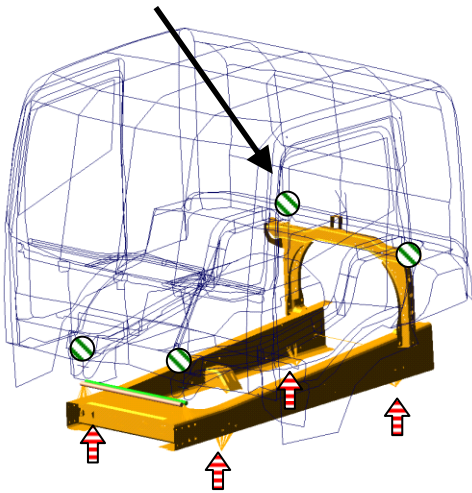


**Frequency response simulated experiment**  
**Good correlation between Exp and CAE**

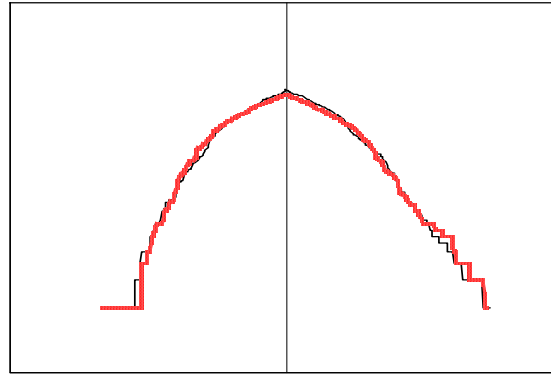
# 4. CAE Results

## Rear Mounting (Rigid type)

Measurement Point

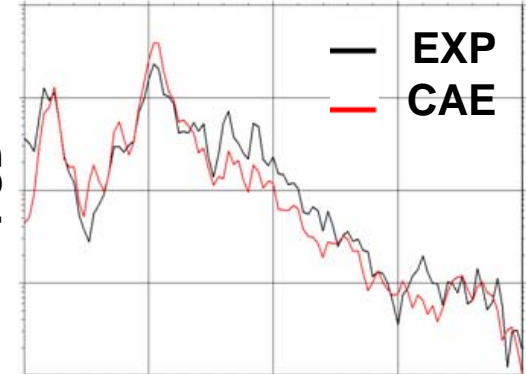


Cumulative Frequency  
[Count/Km]



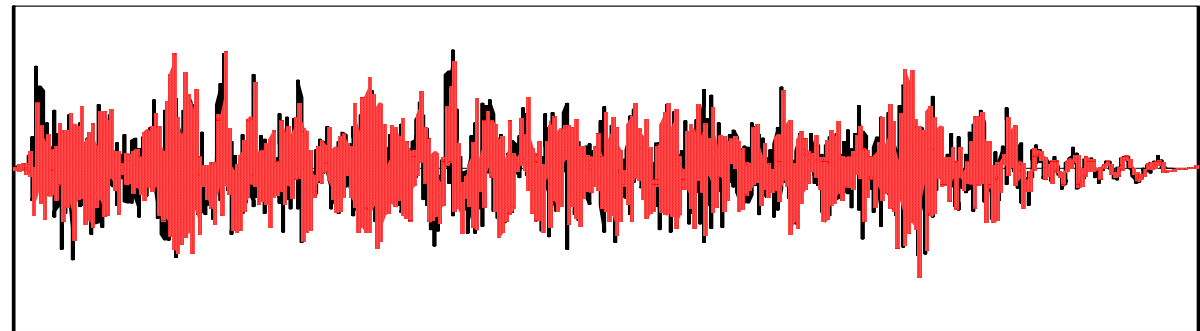
Acceleration [G]

PSD



Frequency [Hz]

Acceleration [G]

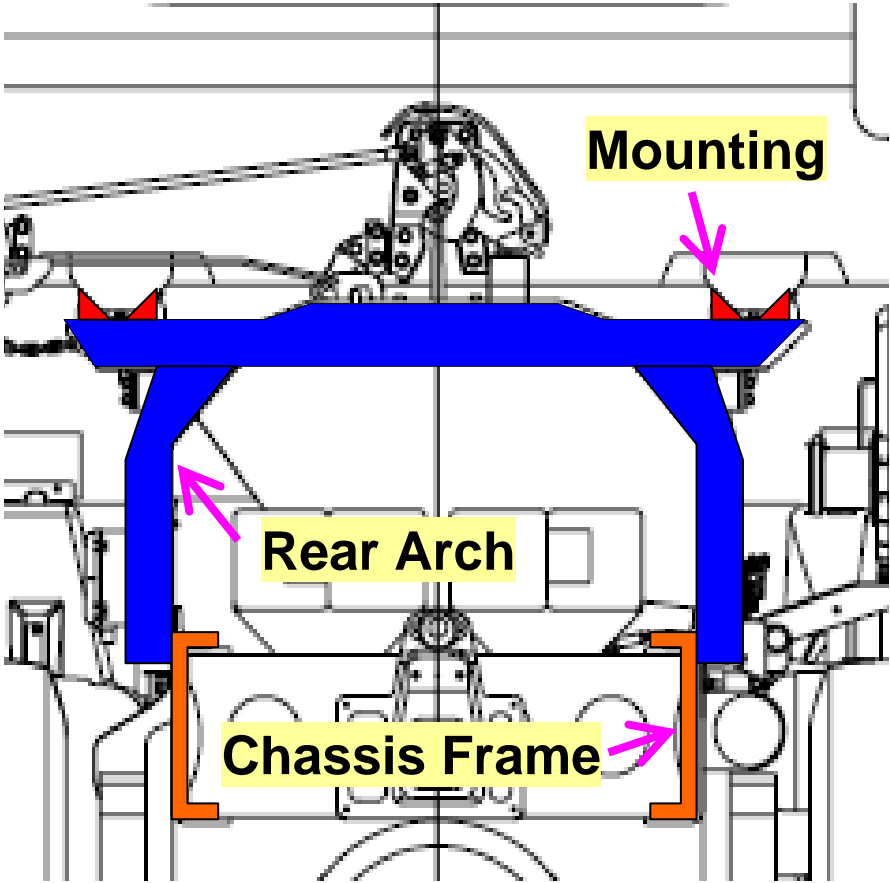


Time [sec]

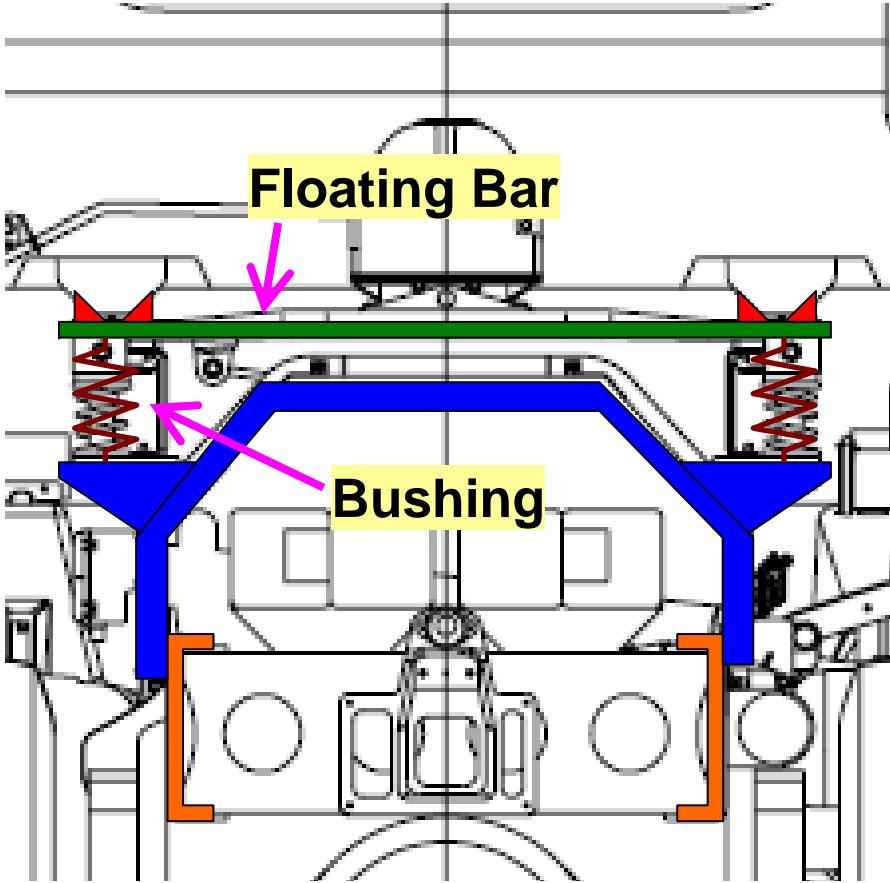
**Good correlation between Exp and CAE  
in the rear side likewise**

# 5. Validation in the different mounting type 12/16

Rigid type



Floating type

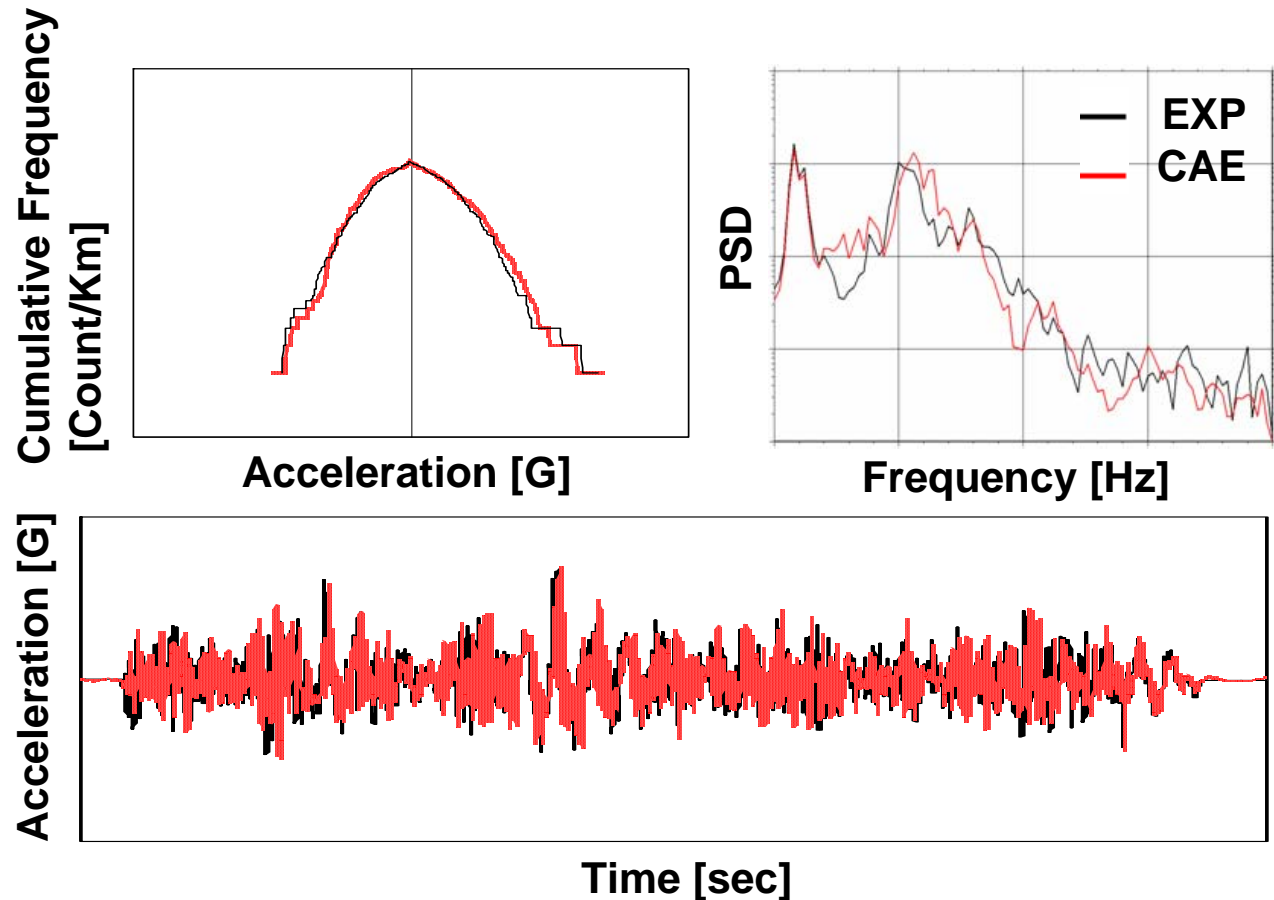
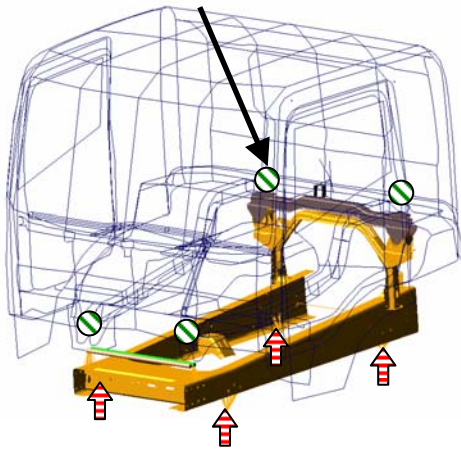


Rear cabin mounting type  
(Rear View)

# 5. Validation in the different mounting type 13/16

## Rear Mounting (Floating type)

Measurement Point



**Good correlation between Exp and CAE  
in the different mounting type likewise**

## 6. Conclusion

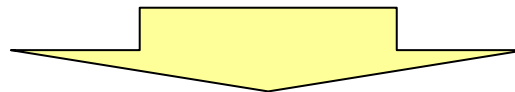
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### Result

**We simulated a experiment with Rigid and Floating specifications in CAE**

### Conclusion

**We established the cabin force prediction from experiment using FEMFAT\_LAB**



**We will be able to do the high accuracy durability evaluation analyses**

## **7. Future Tasks**

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- 1. Performing cabin force prediction in the cabin mount specifications difference**
- 2. Performing lifetime prediction using the cabin forces obtained by FEMFAT\_LAB**



**HINO**

**Thank you for your attention**