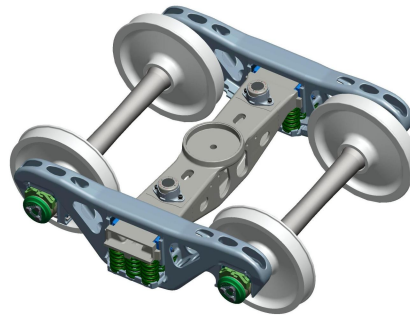


# Truck System Function and Performance

Presented By:

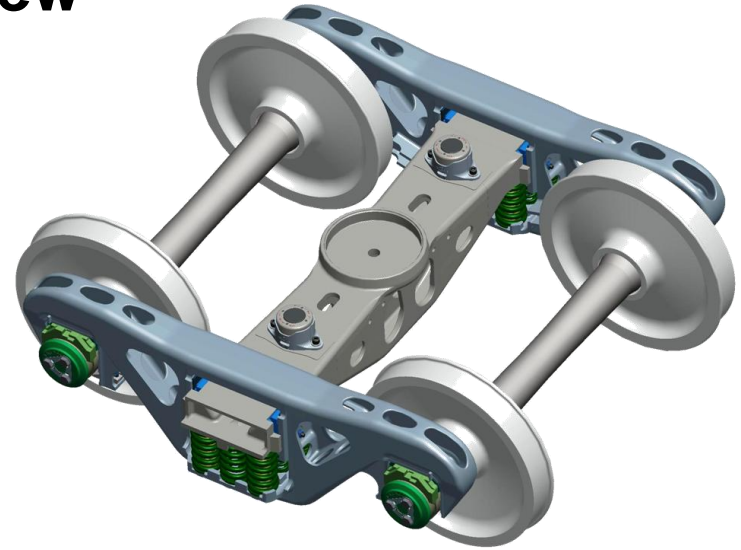
**Nathan Reese**

**Director, Truck Systems Engineering**



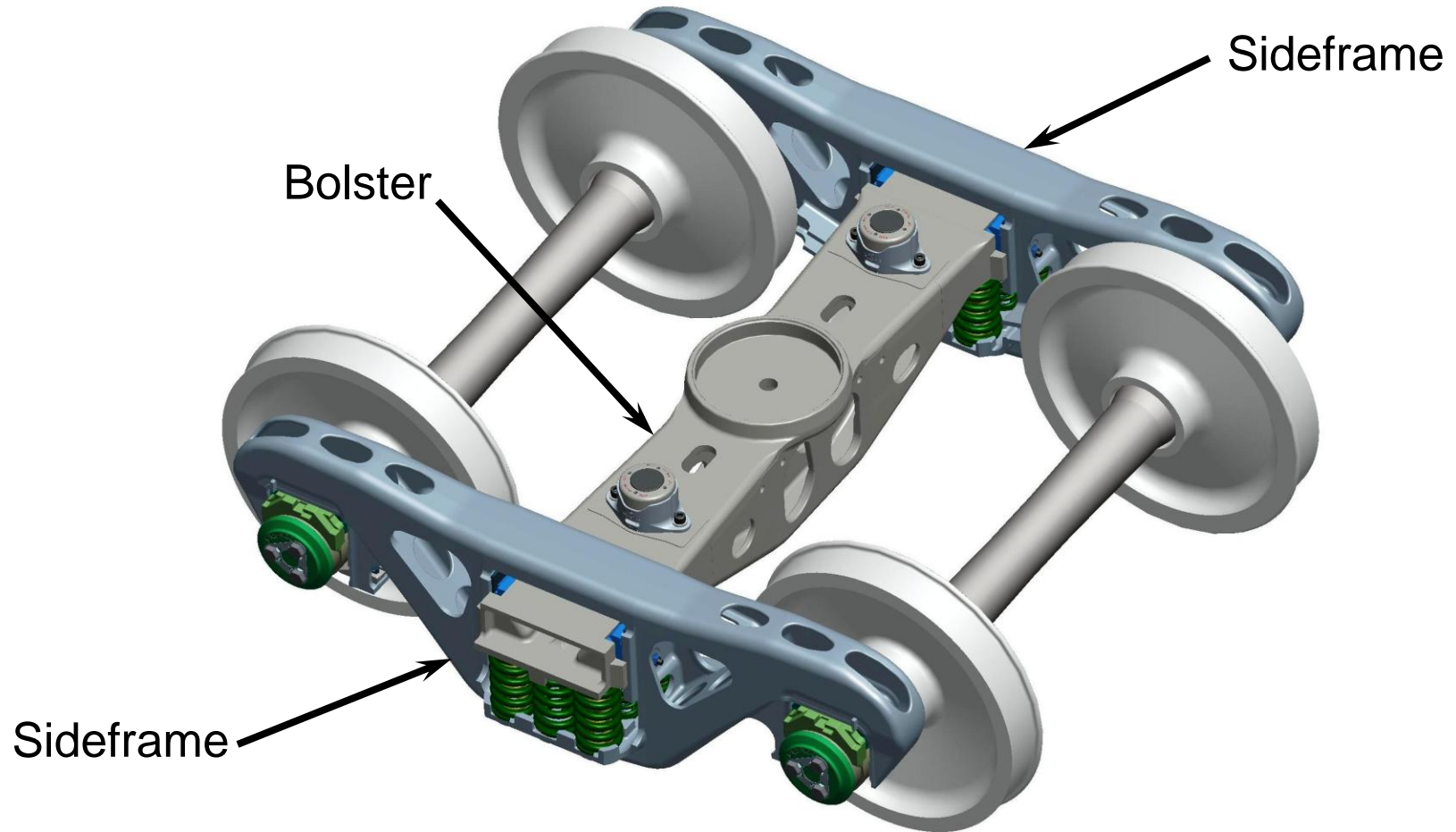
# Agenda

- **Truck Part Nomenclature**
- **Truck Performance Overview**
- **Primary Suspension**
  - **Parts**
  - **Maintenance**
- **Secondary Suspension**
  - **Parts**
  - **Maintenance**
- **Car Body / Truck Connection**
  - **Maintenance**

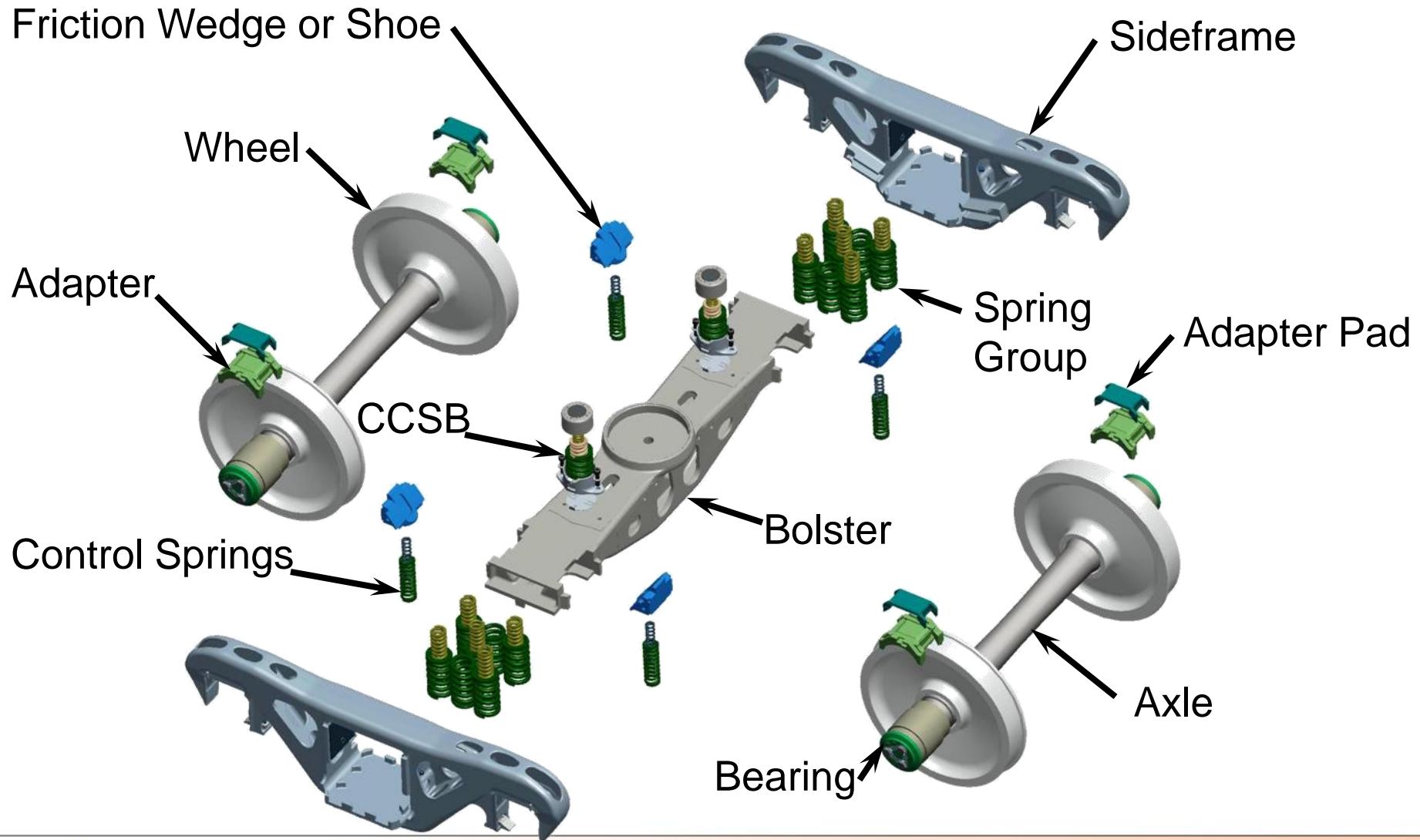


# Truck Nomenclature

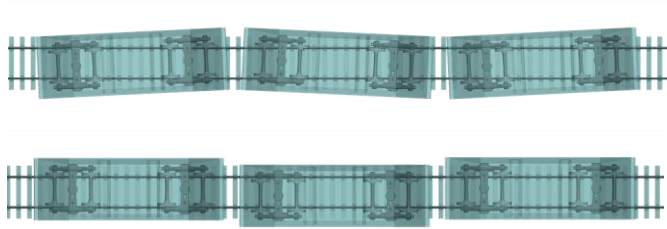
## 3-Piece Truck



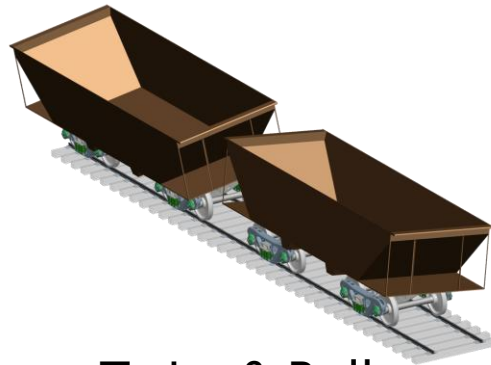
# Truck Nomenclature



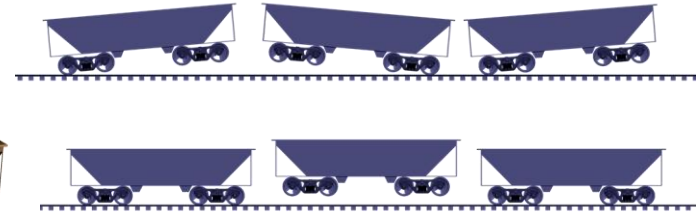
# Truck Performance Overview



Yaw & Sway  
Car / Suspension Specific



Twist & Roll  
15–25, 50–60 mph



Pitch & Bounce  
50–70 mph

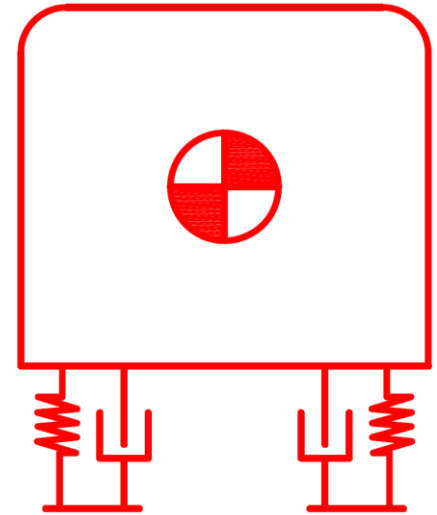


Truck Hunting  
Truck Warp, Truck Rotation, Wheelset Movement  
40+ mph



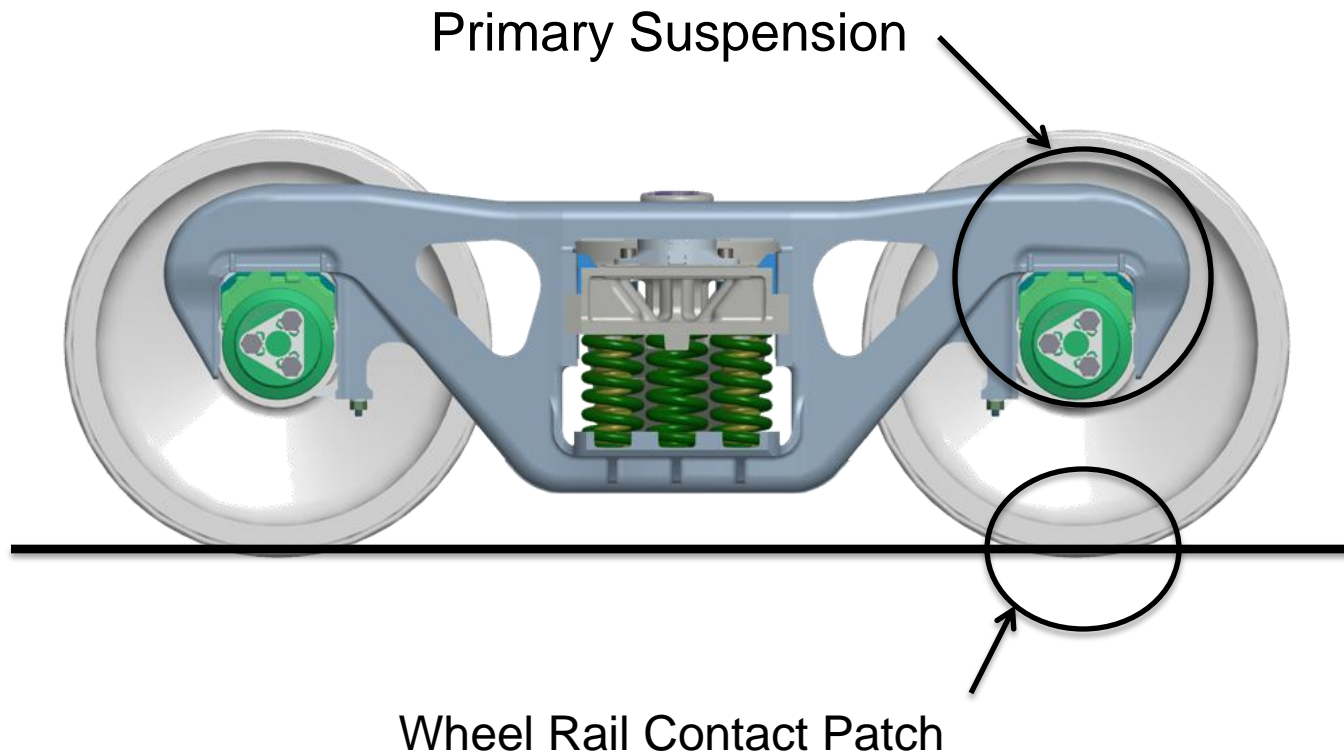
# Dynamic Influences

- Wheel to Rail Contact
- Primary Suspension
- Secondary Suspension
- Speed
- Track Input
- Mass/Inertias (Car Body, Truck Components)
- Friction

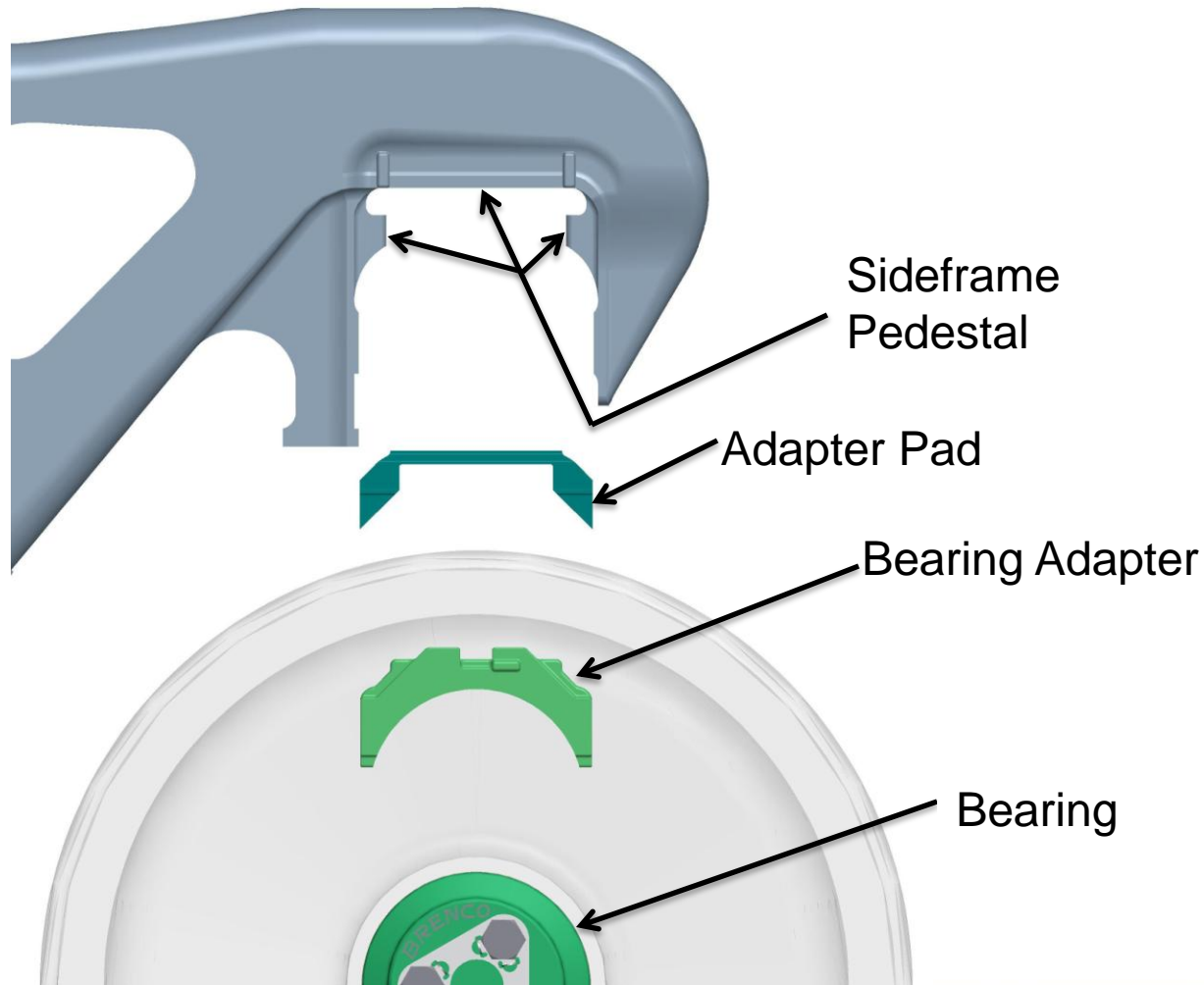




# Primary Suspension

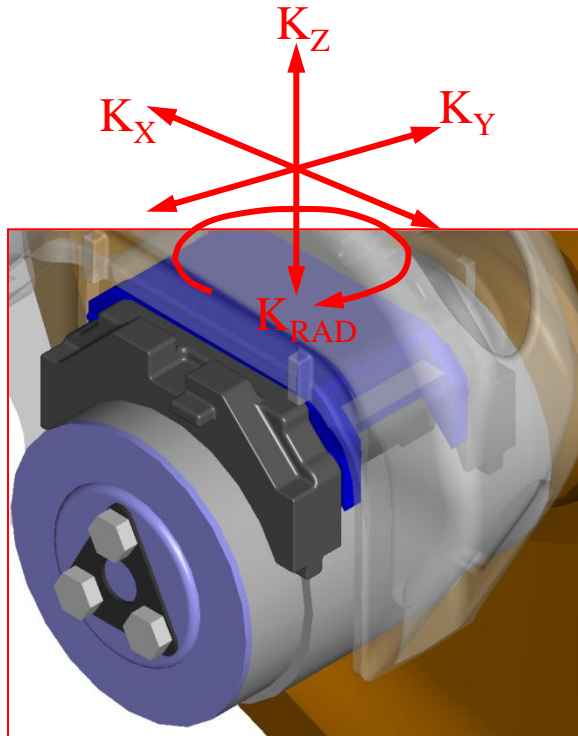


# Primary Suspension



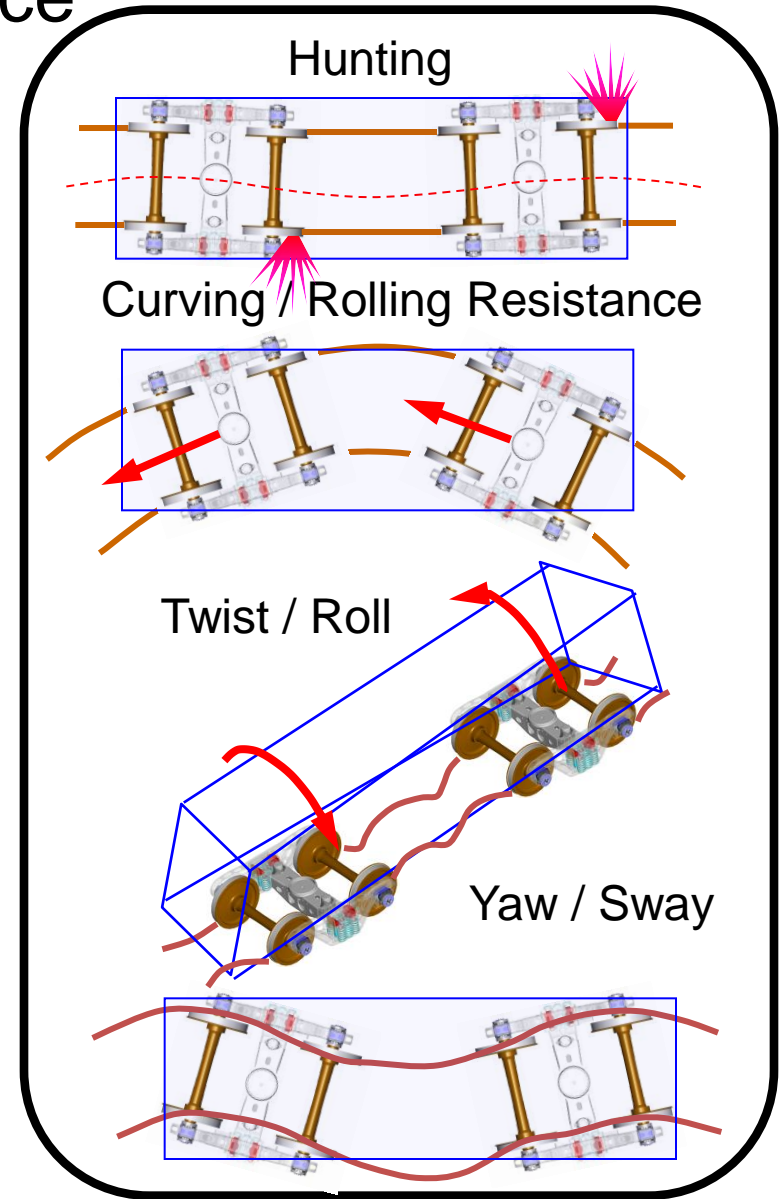


# Primary Suspension Performance

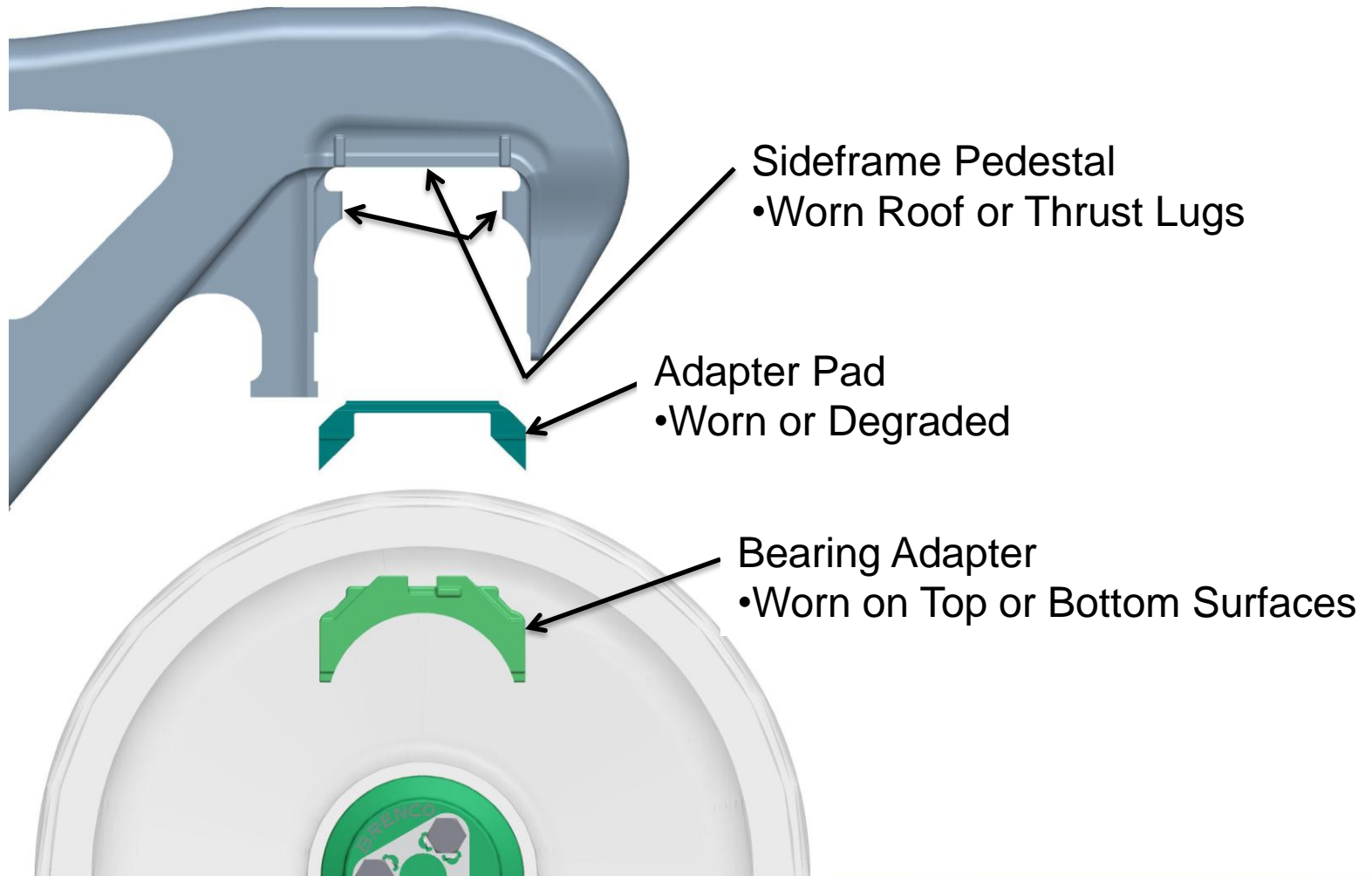


## Passive Steering

- Provides wheelset alignment to reduce wheel wear
- Designed pad stiffness enhances performance

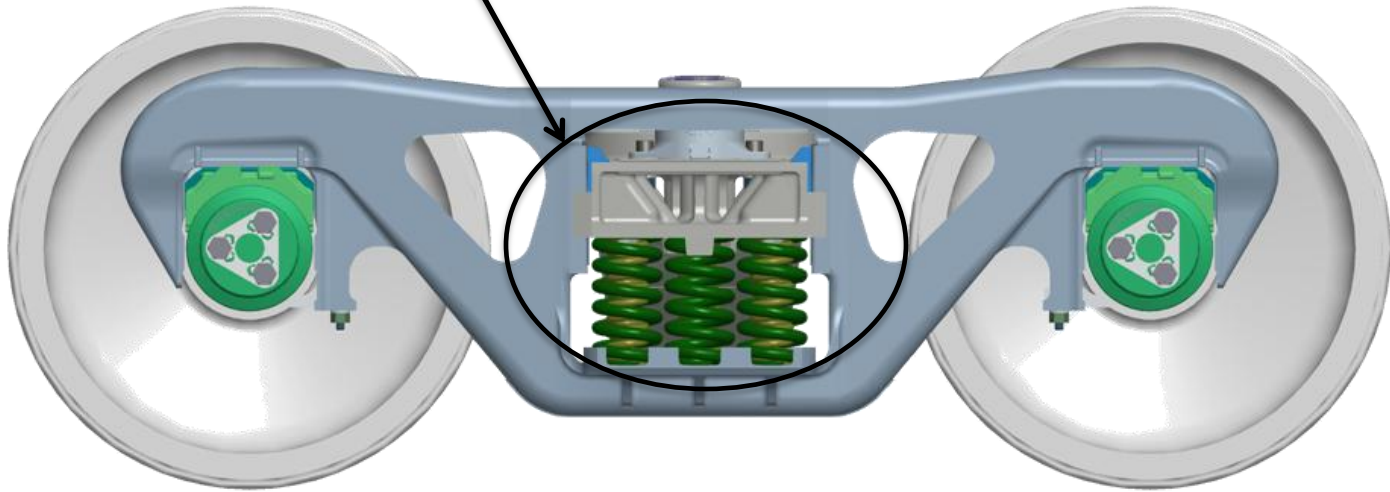


# Primary Suspension Maintenance

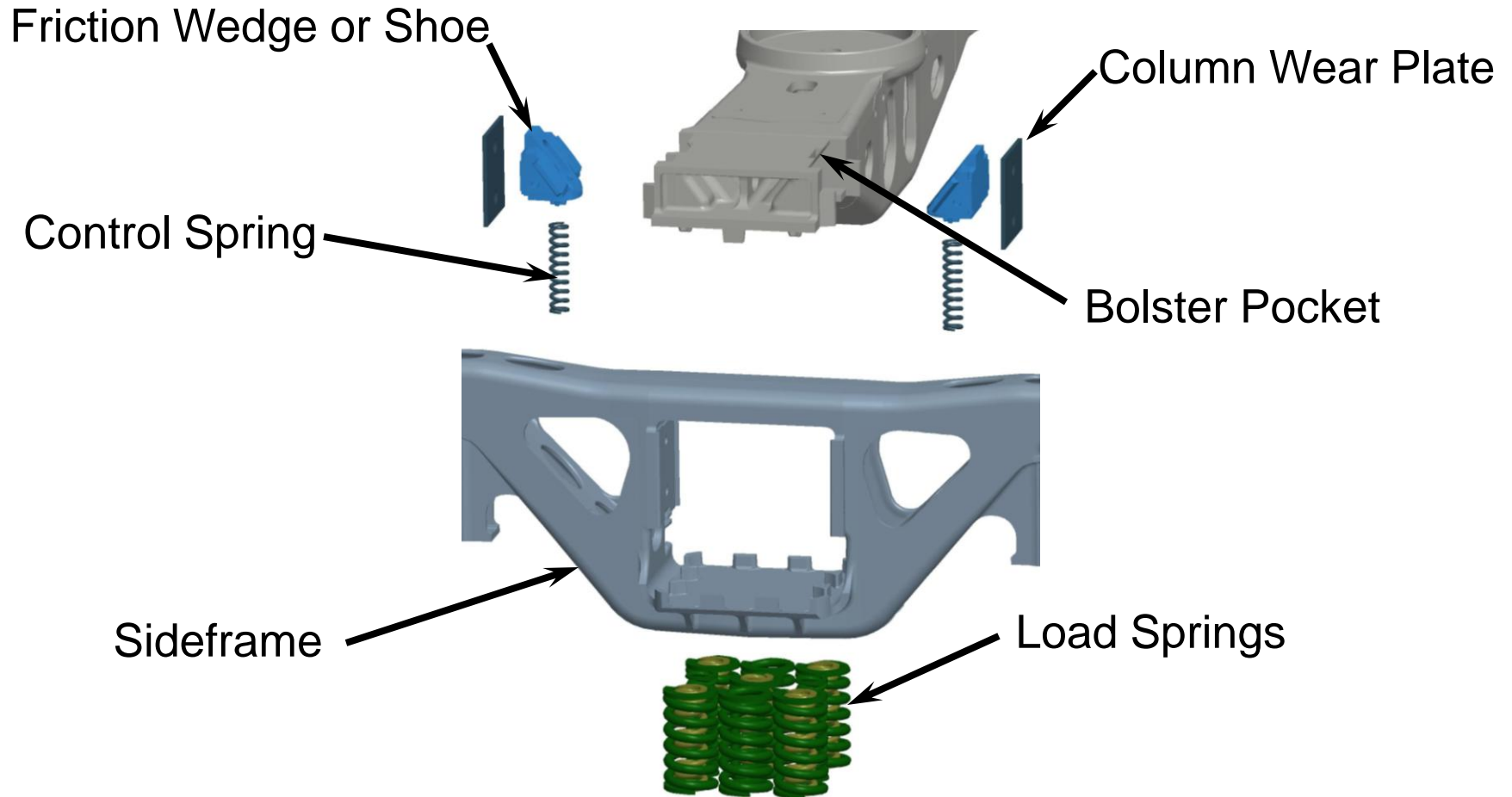


# Secondary Suspension

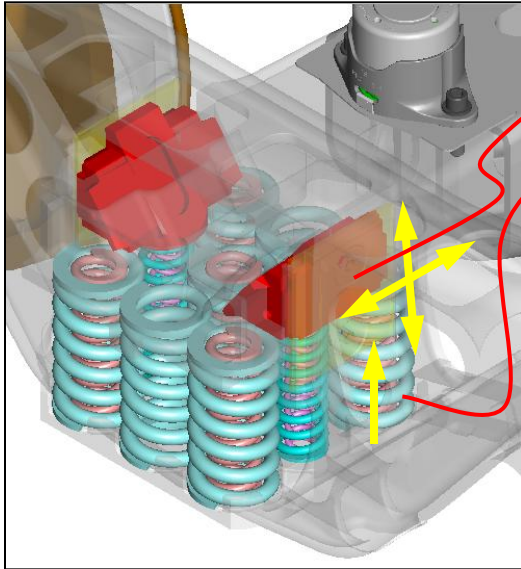
Secondary Suspension



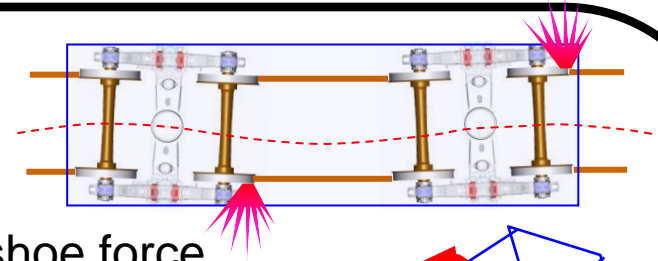
# Secondary Suspension



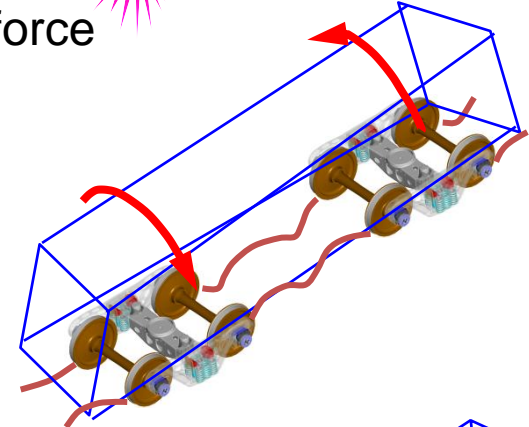
# Secondary Suspension Performance



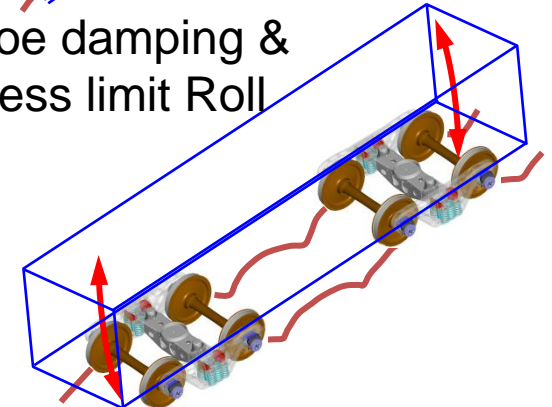
- Friction Shoe
- Springs



Hunting  
Friction shoe force  
limits warp



Twist / Roll  
Tuned friction shoe damping &  
suspension stiffness limit Roll

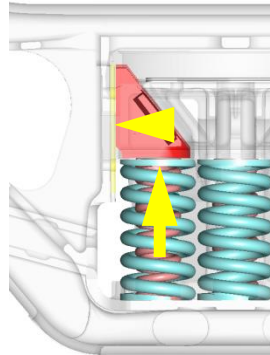
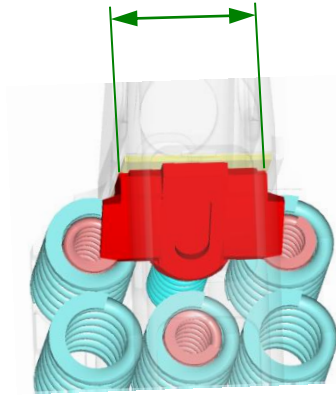
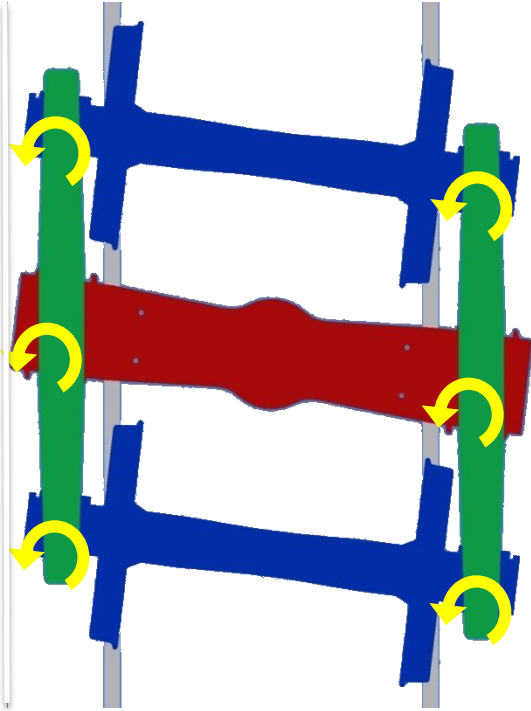


Pitch / Bounce  
Tuned friction shoe damping &  
suspension stiffness limit Pitch / Bounce



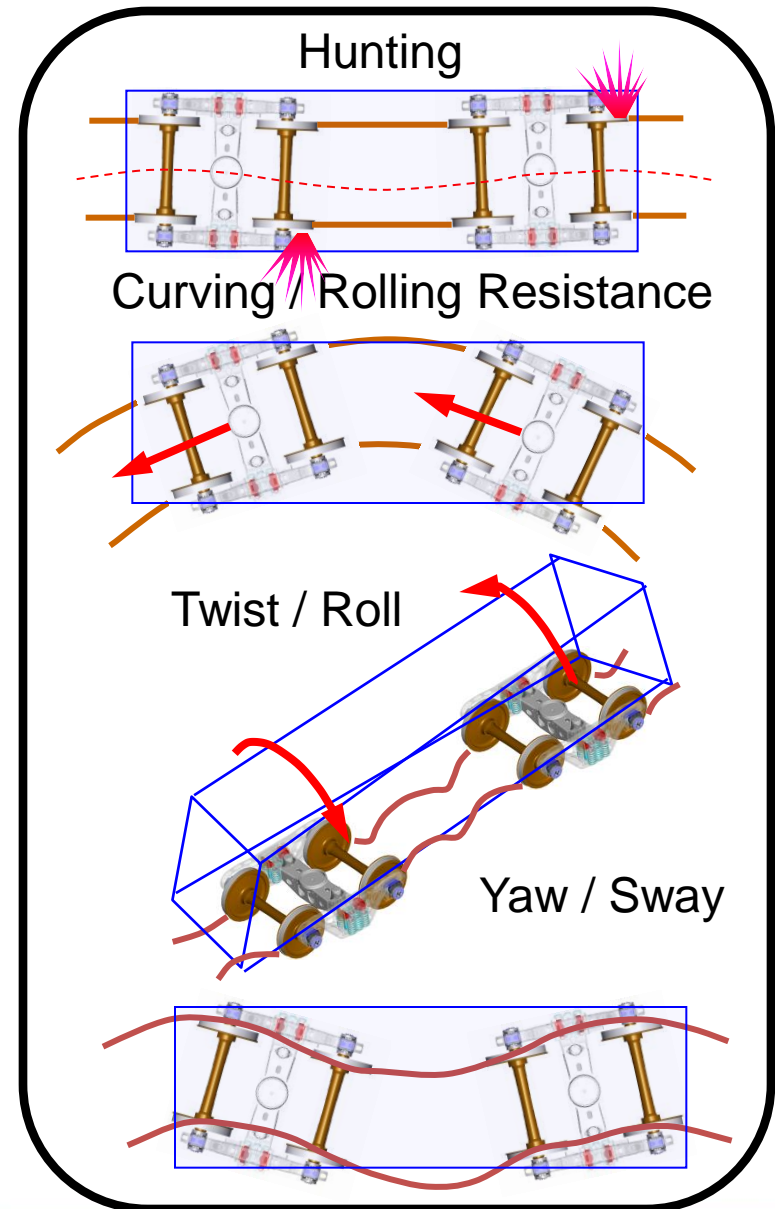


# Secondary Suspension Performance Cont'd



## Warp Stiffness

The warp stiffness design is controlled by the shoe width and force

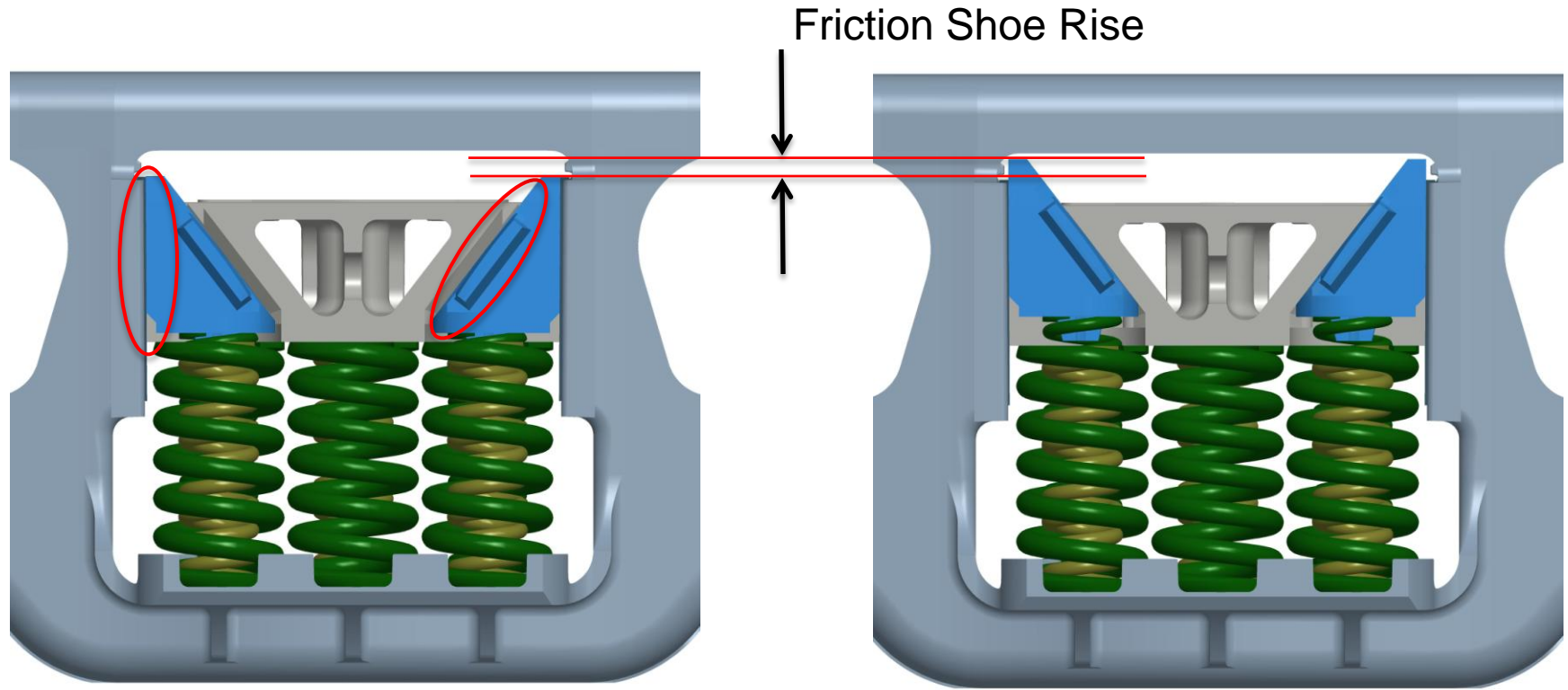




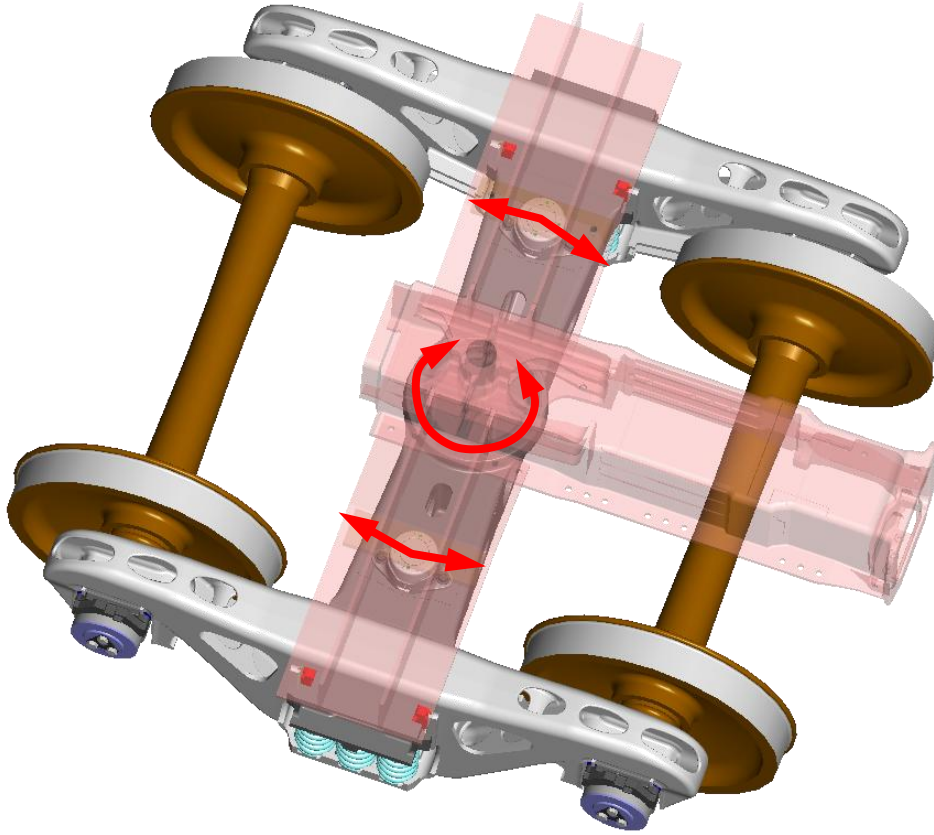
# Secondary Suspension Maintenance

## Wear Surfaces

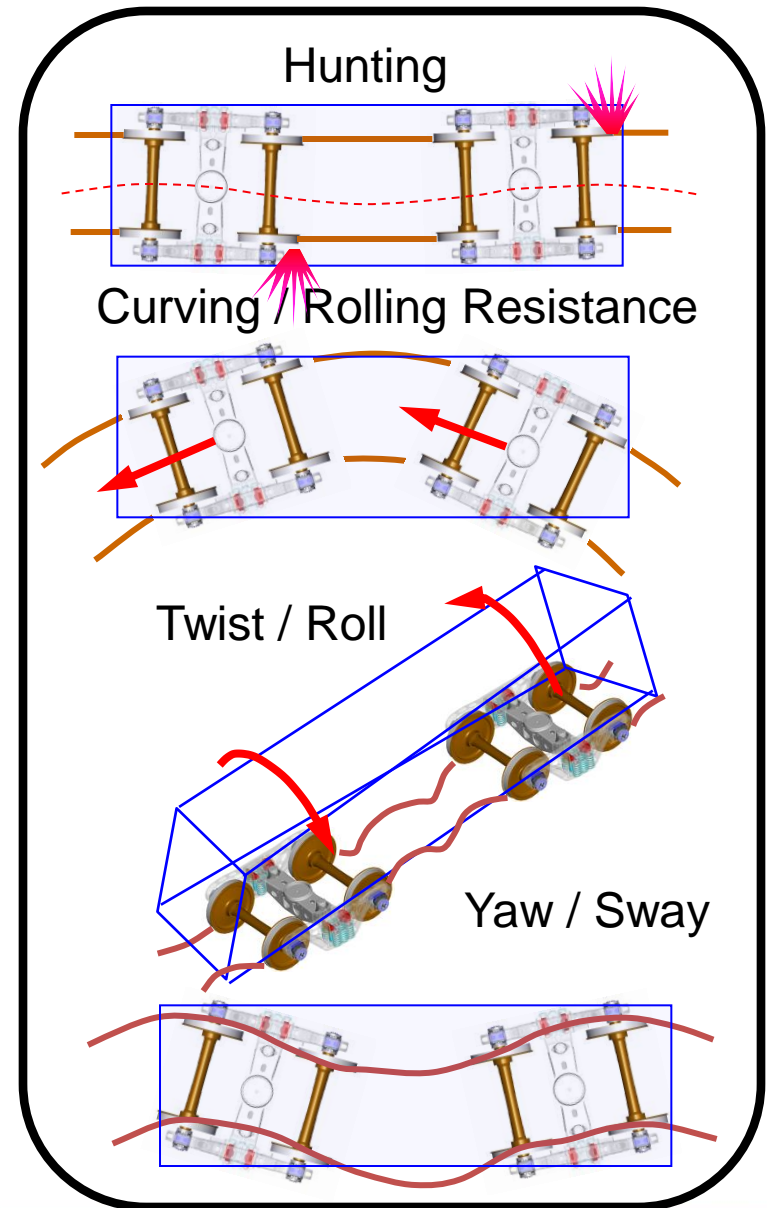
- Friction Shoe (Slope and Face)
- Column Wear Plate
- Bolster Pocket



# Car body / Truck Interface

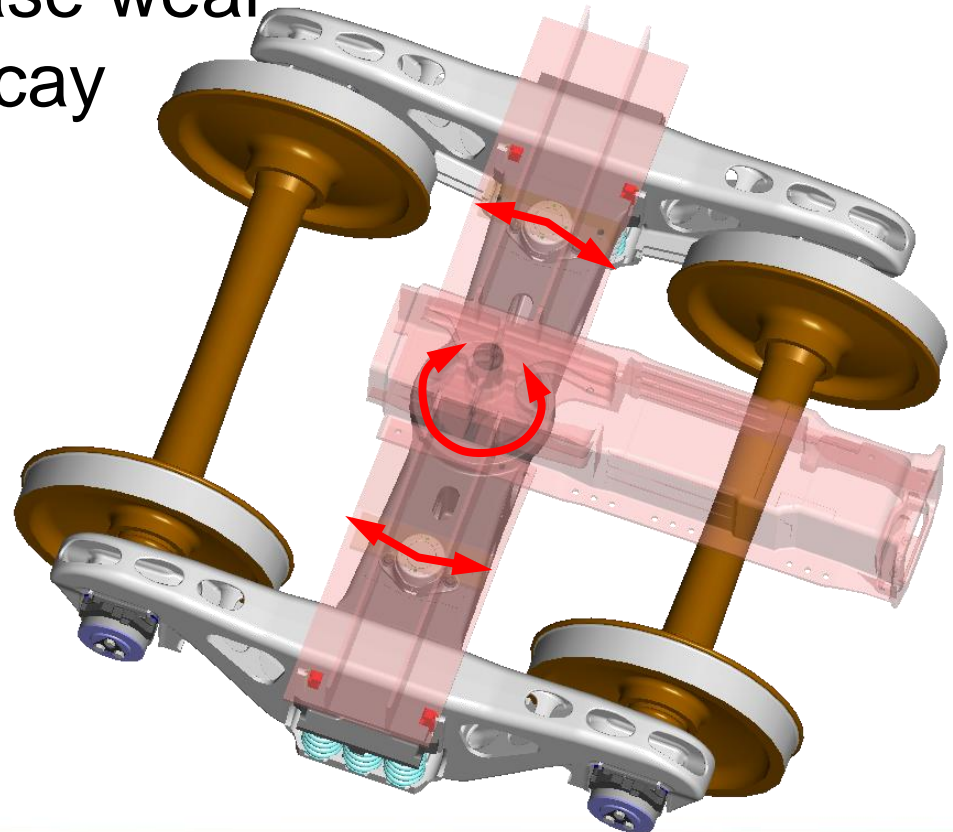


Side Bearing / Center Plate friction needs to remain consistent for good performance



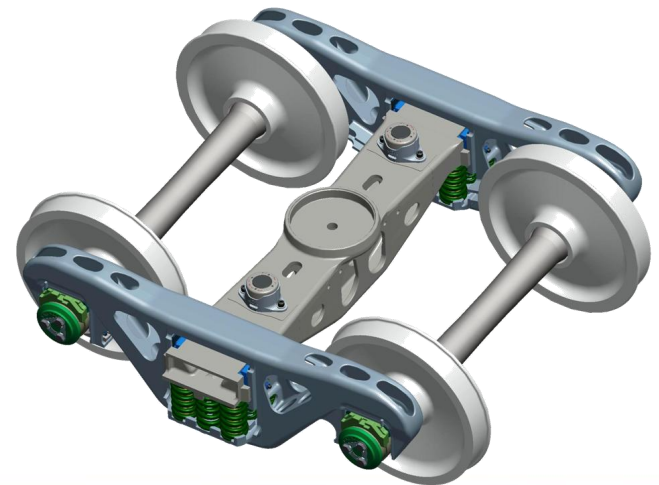
# Car Body / Truck Interface Maintenance

- Car body center plate wear
- Center bowl liner wear
- Side bearing cap and base wear
- Side bearing preload decay



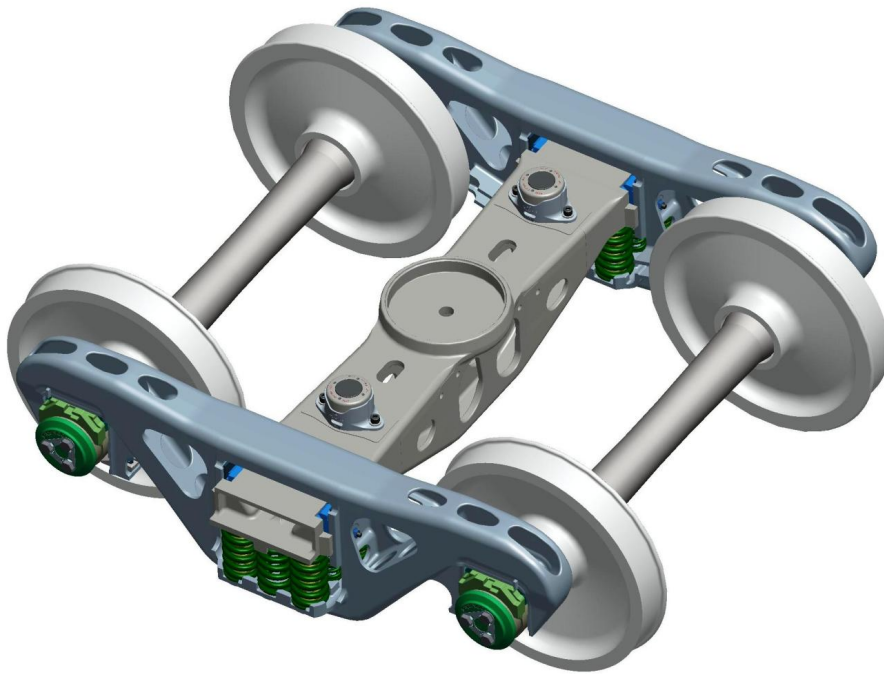
# Summary

- Truck systems utilize a Primary and Secondary suspension
- The dynamic performance of the truck is dependent on the suspension parts
- Maintenance of the suspension parts is critical to the performance and overall life of the truck system



# Thank You

Contact Info: [nreese@amstedrail.com](mailto:nreese@amstedrail.com)



***Amsted Rail***

