Safeliner

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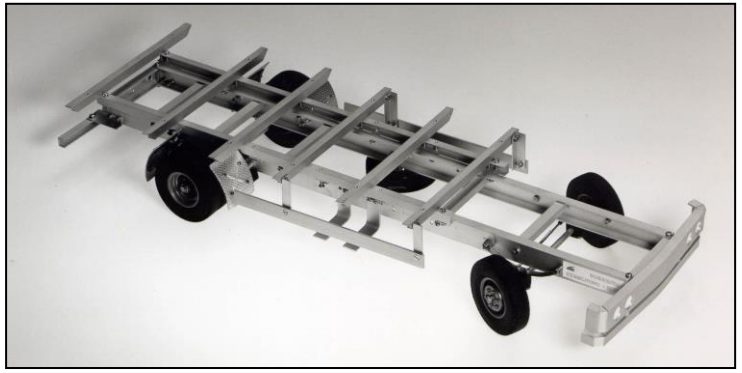
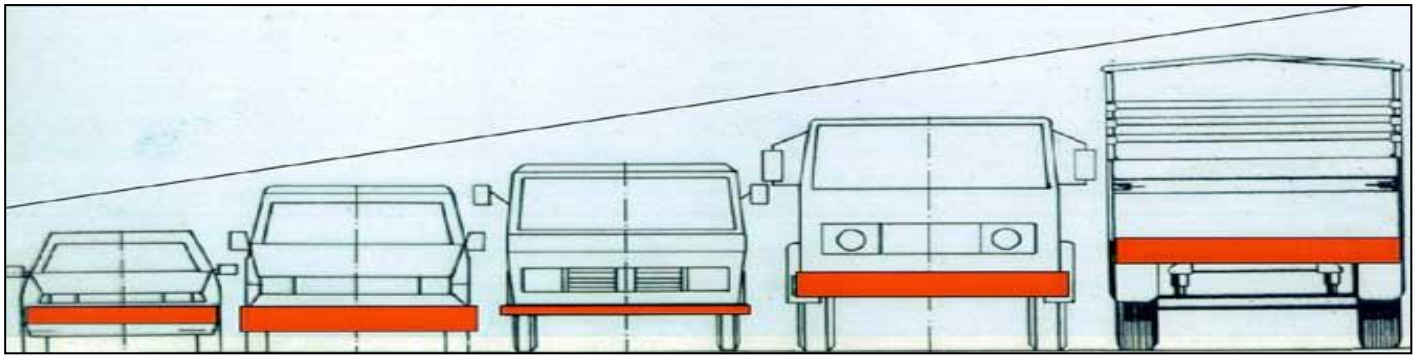
Current situation: The steel ladder frame has been with us for a century.





No compatibility between vehicles

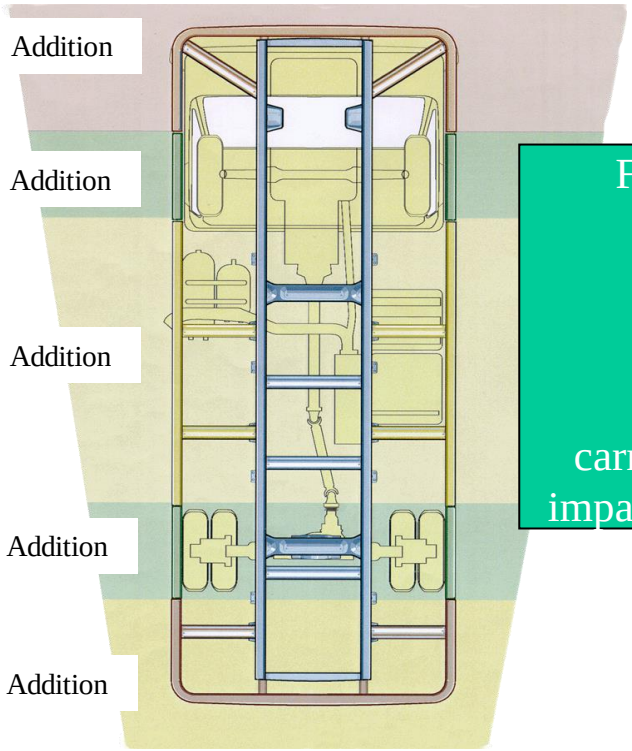
Current situation (40mph)

Current situation

Current situation

Problem: The steel ladder frame has been with us for a century.

Board Frame - Benefits



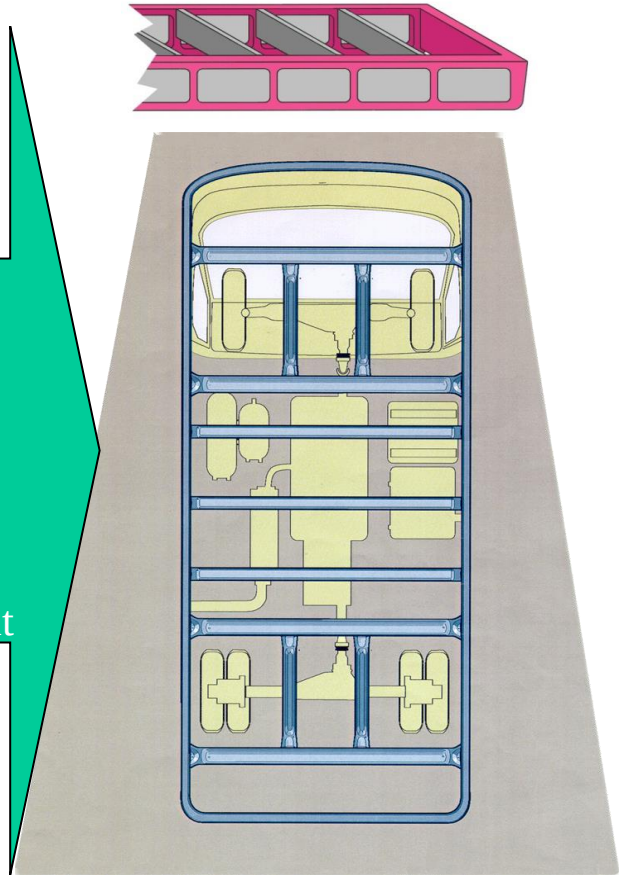
From board frame

to

safety frame

as

carrier, encasement and impact protection element



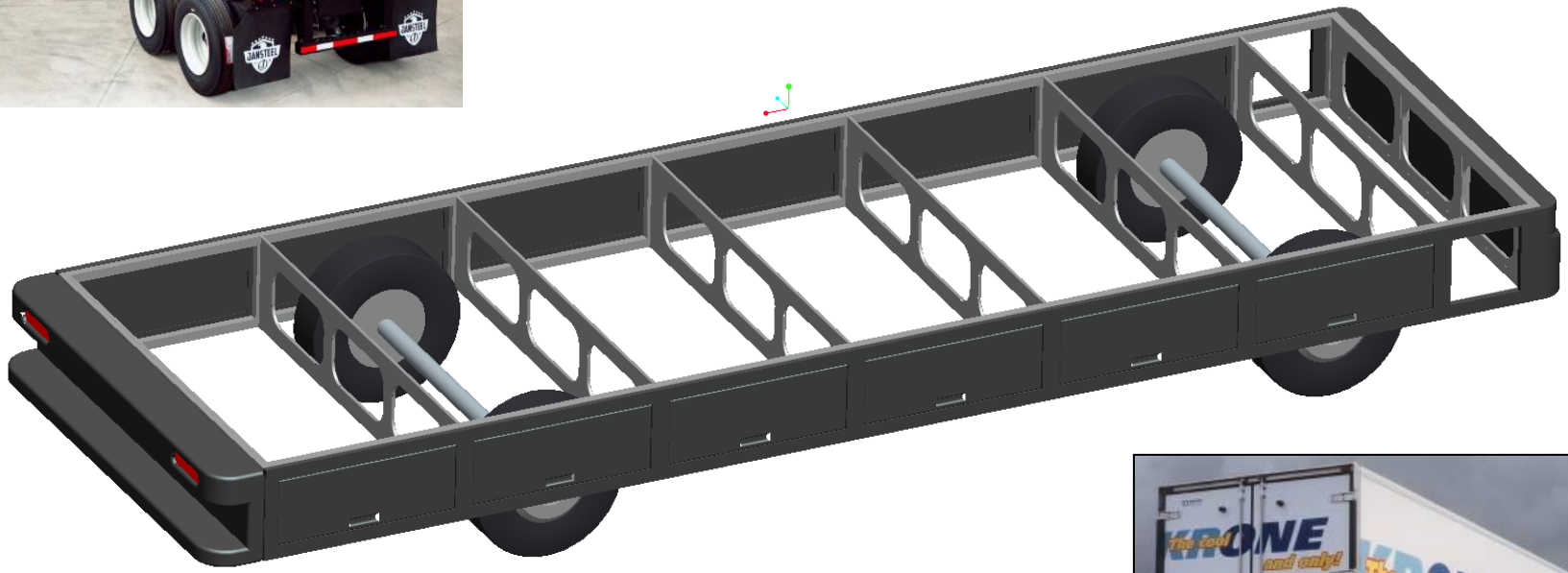
Underride protection - front

Splash protection / noise encapsulation

Underride protection - lateral

Underride protection - rear

From steel ladder frame to plank frame

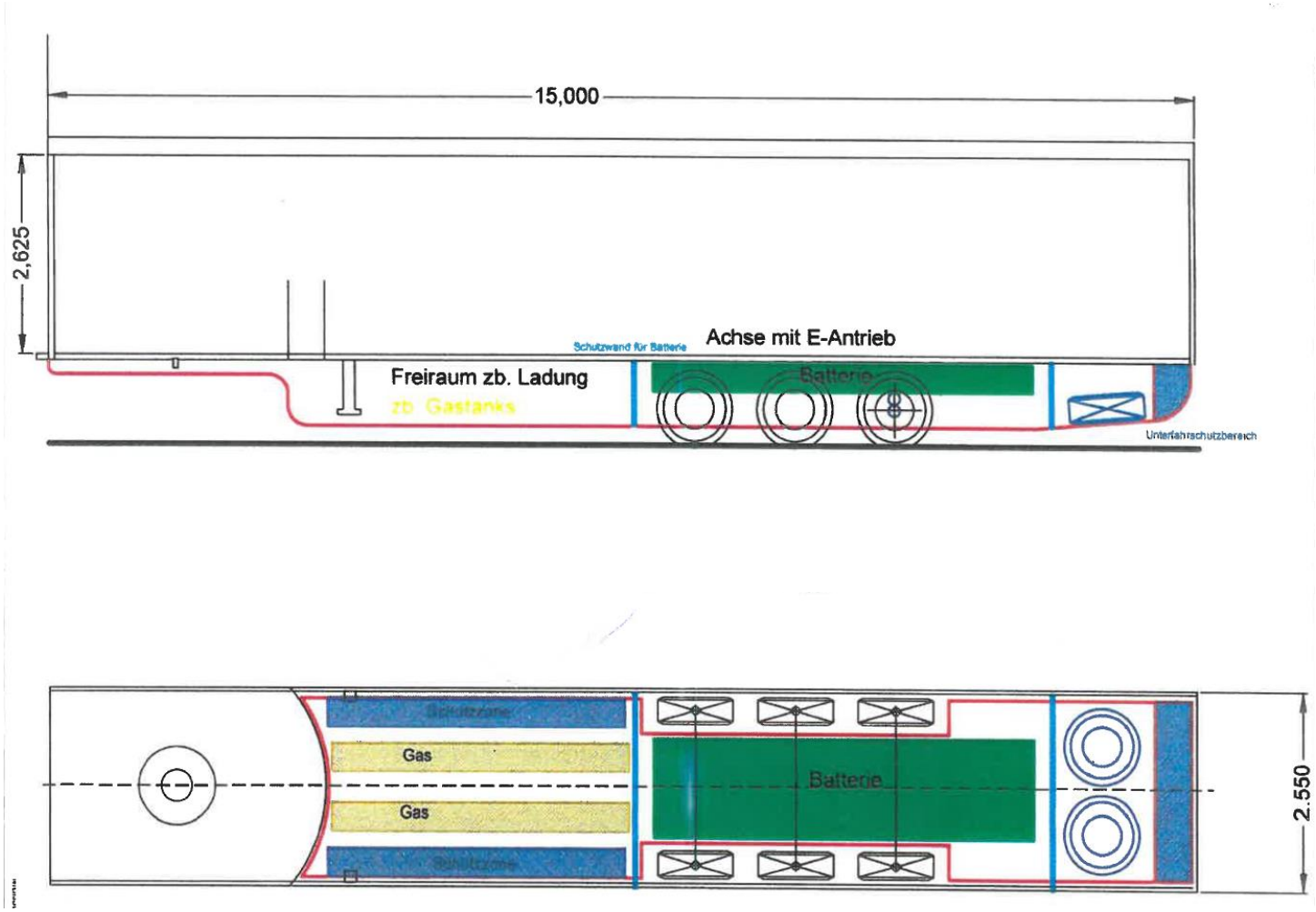


Crashtests

Realization Safeliner (vehicle manufacturer Krone)

No spray rain

More and safer loading volume



Tire change (lowering the frame to the ground)

Advantages

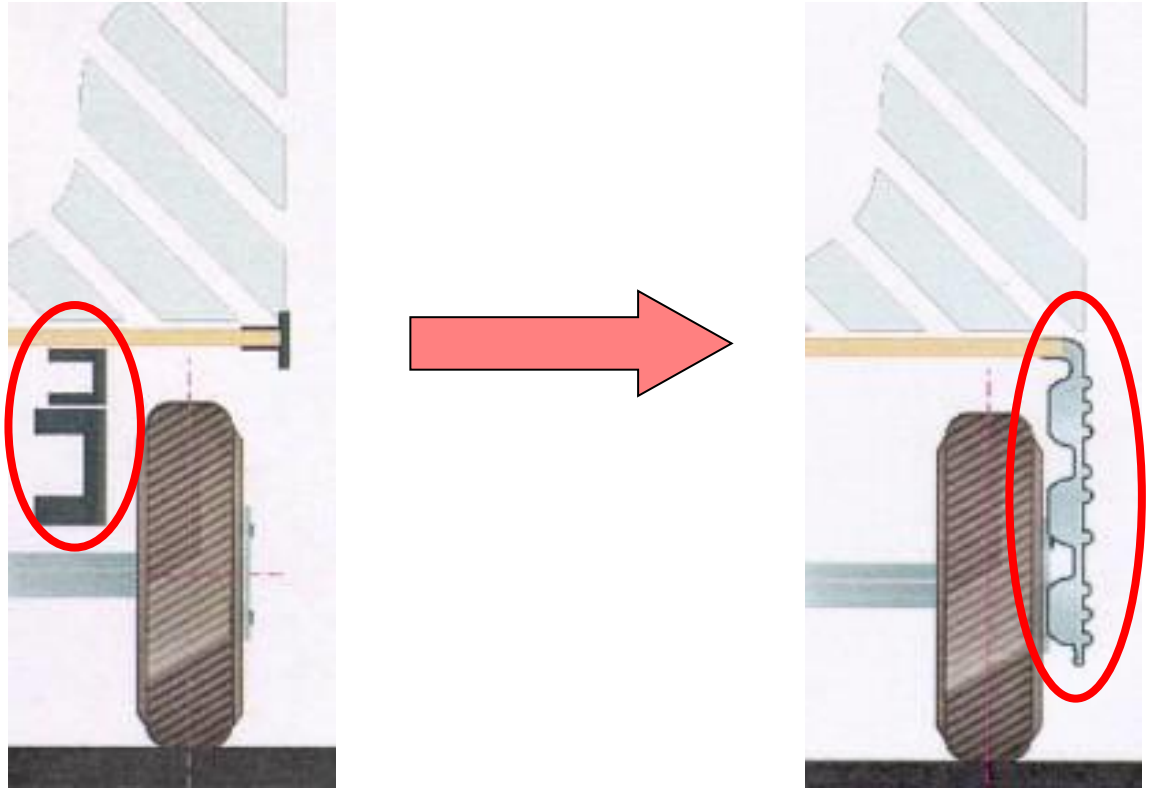
- ✓ more loading volume
- ✓ lower fuel costs
- ✓ Truck battery pack protection
- ✓ no splashing water
- ✓ shorter queue lengths after accidents
- ✓ better visible in the dark
- ✓ Sun protection for tires
- ✓ lower accident costs
- ✓ more advertising space
- ✓ reduction of insurance premiums
- ✓ Tire abrasion and brake dust can be extracted

Advantages of the aluminum construction

- ✓ Aluminum is significantly lighter than steel
- ✓ Lower fuel consumption
- ✓ More cargo possible with the same total weight
- ✓ Longer lifespan
- ✓ Recycling and recovery possible
- ✓ Reduced aggressiveness in accidents
- ✓ High rigidity and above-average crash safety

Possibility of building an aluminum plank frame

No possibility to go deeper because of the axis



Possibility of building an aluminum plank frame

Audi Space Frame

Aluminium plank frame

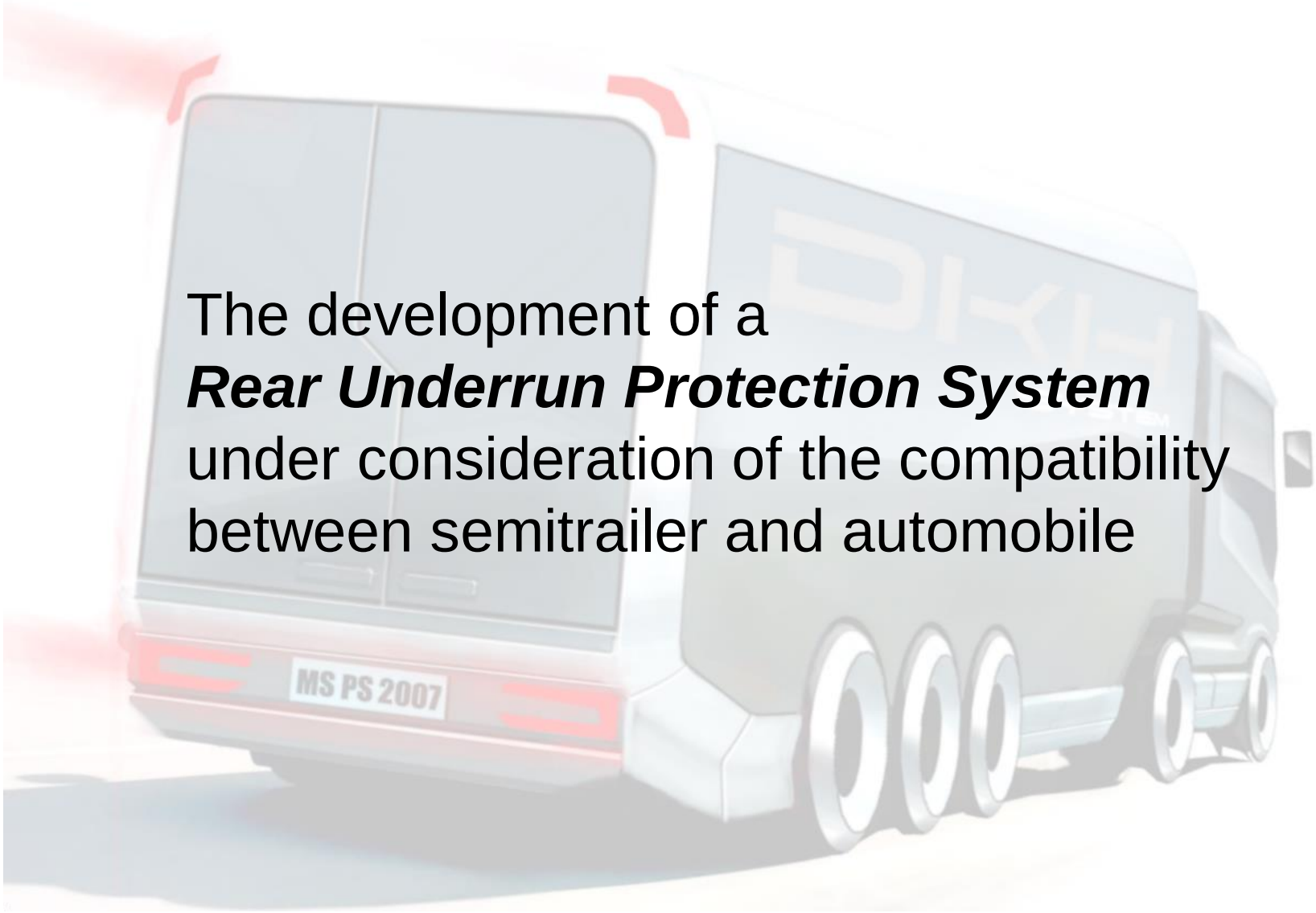
Possibility of building an aluminum plank frame

Product liability case

Product liability case

CTS

INFATEC
CONSULTING FÜR INNOVATIVE FAHRZEUGTECHNIK GMBH

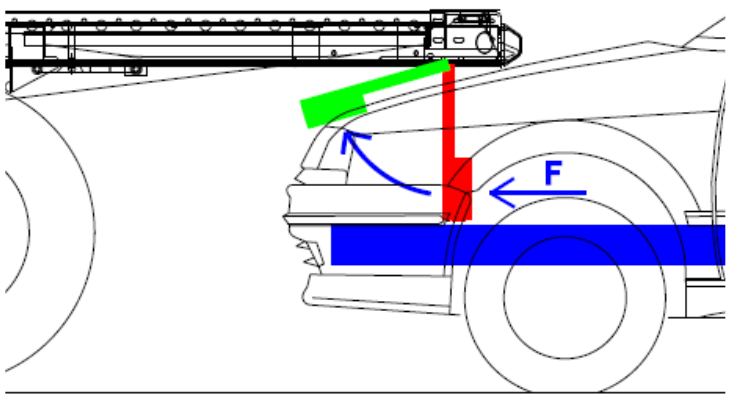


The development of a ***Rear Underrun Protection System*** under consideration of the compatibility between semitrailer and automobile

Peter Schimmelpfennig

Compatibility problem

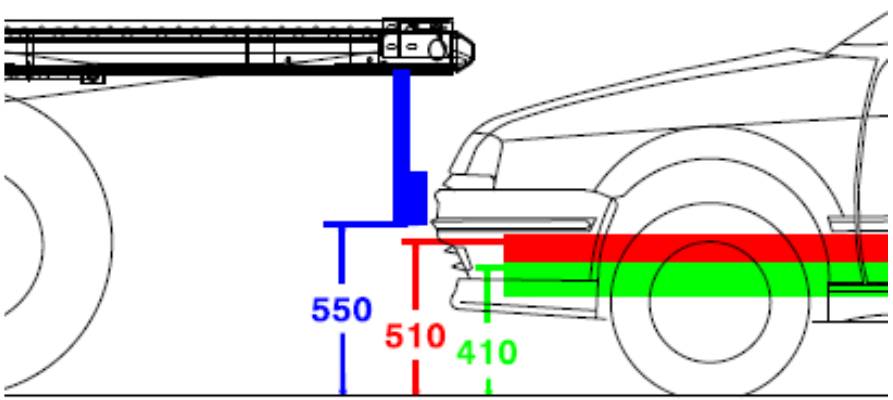
Force compatibility problem



- constructed like a cantilever

→ Underrun Protection System bends off

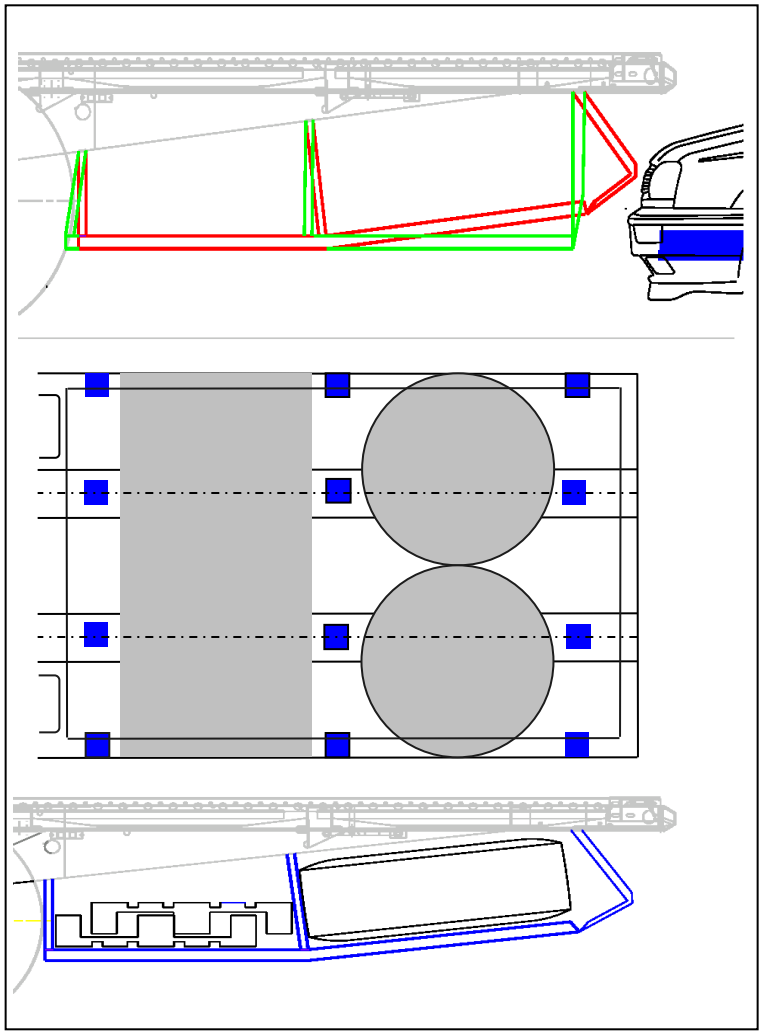
Height compatibility problem



- more than 150 mm difference in height

→ side member underrides the Rear Underrun Protection System

Constructional sketch



Completion of all demands:

- EU-Criteria for the Rear Underrun Protection Systems,

- EU-Criteria for the Sea Transport,

- Carrier requests (neutral weight, neutral costs, loading space)

Enabled through:

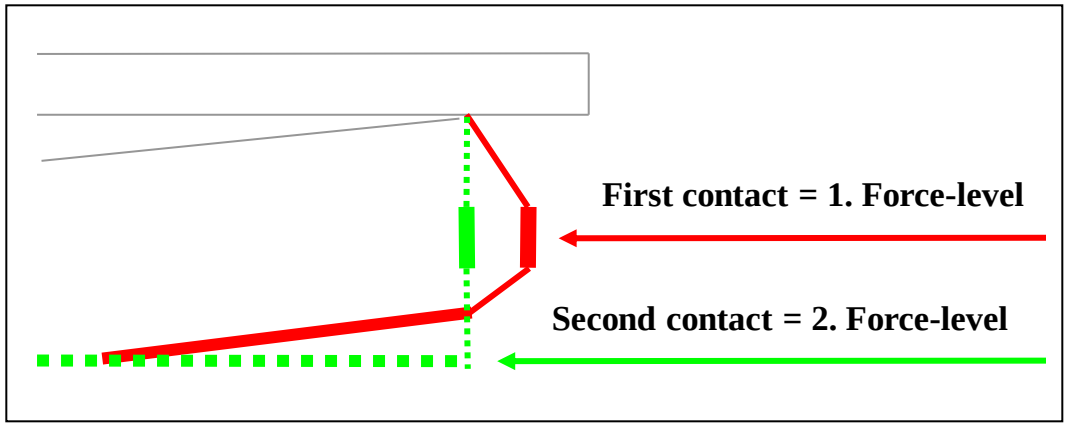
- Construction of a second level, which accomplishes all height demands in the static position,

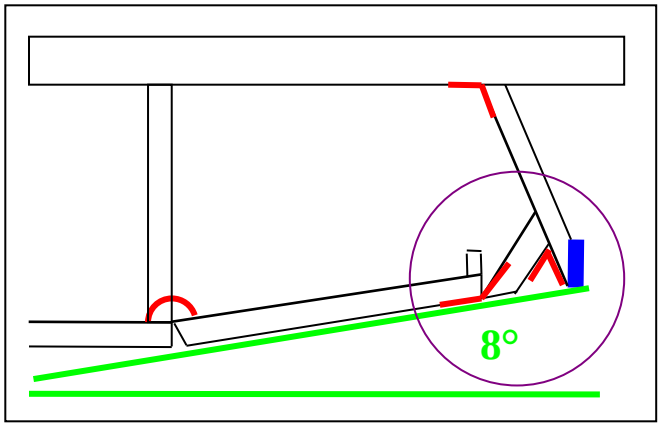
- Guide poles, which are attached on the main girder and on the outside frame of the semitrailer,

- Angeled rear, which dynamically moves the back of the second level in compatible height to the side member of the car

- Support of the whole system on the wheels of the last axis of the semitrailer

Construction analysis



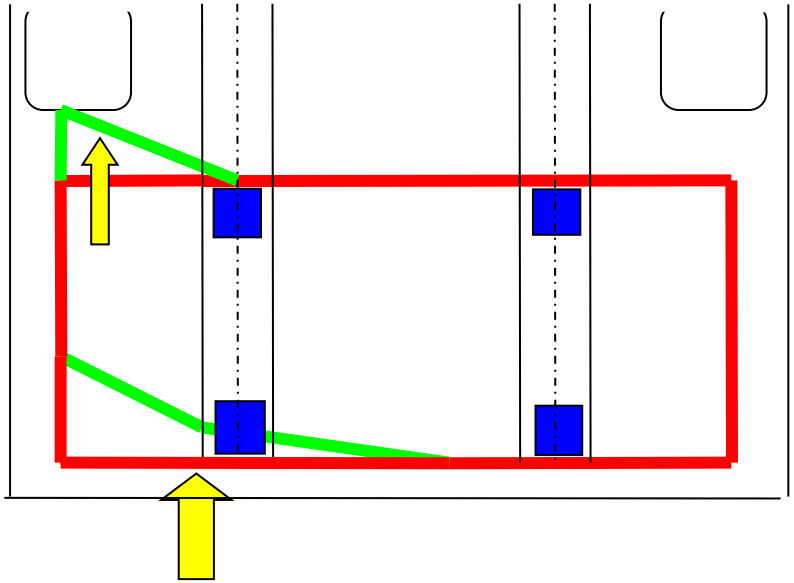


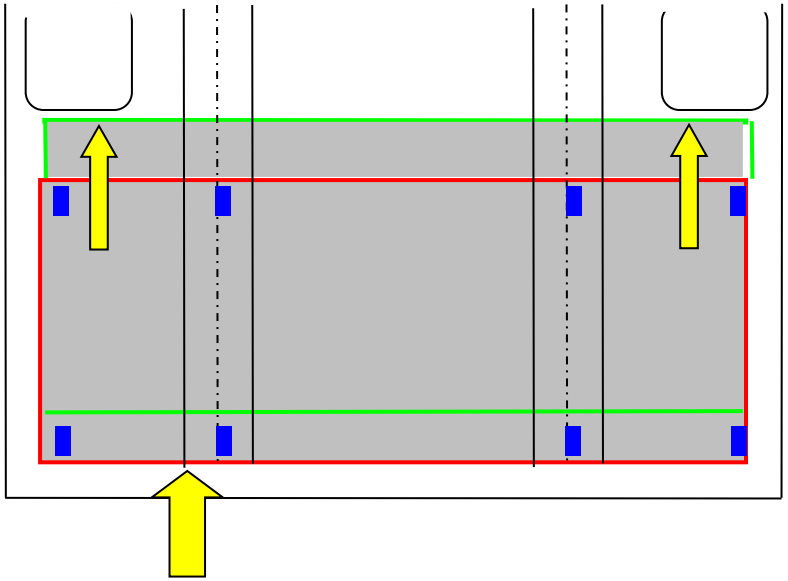
- The name of the system results from the function of the system:

Dynamically Compatible Rear Impact System

(Dynamisch-Kompatibles-Heckaufprallsystem (DKH-System)

Analysis of an appropriate load transmission





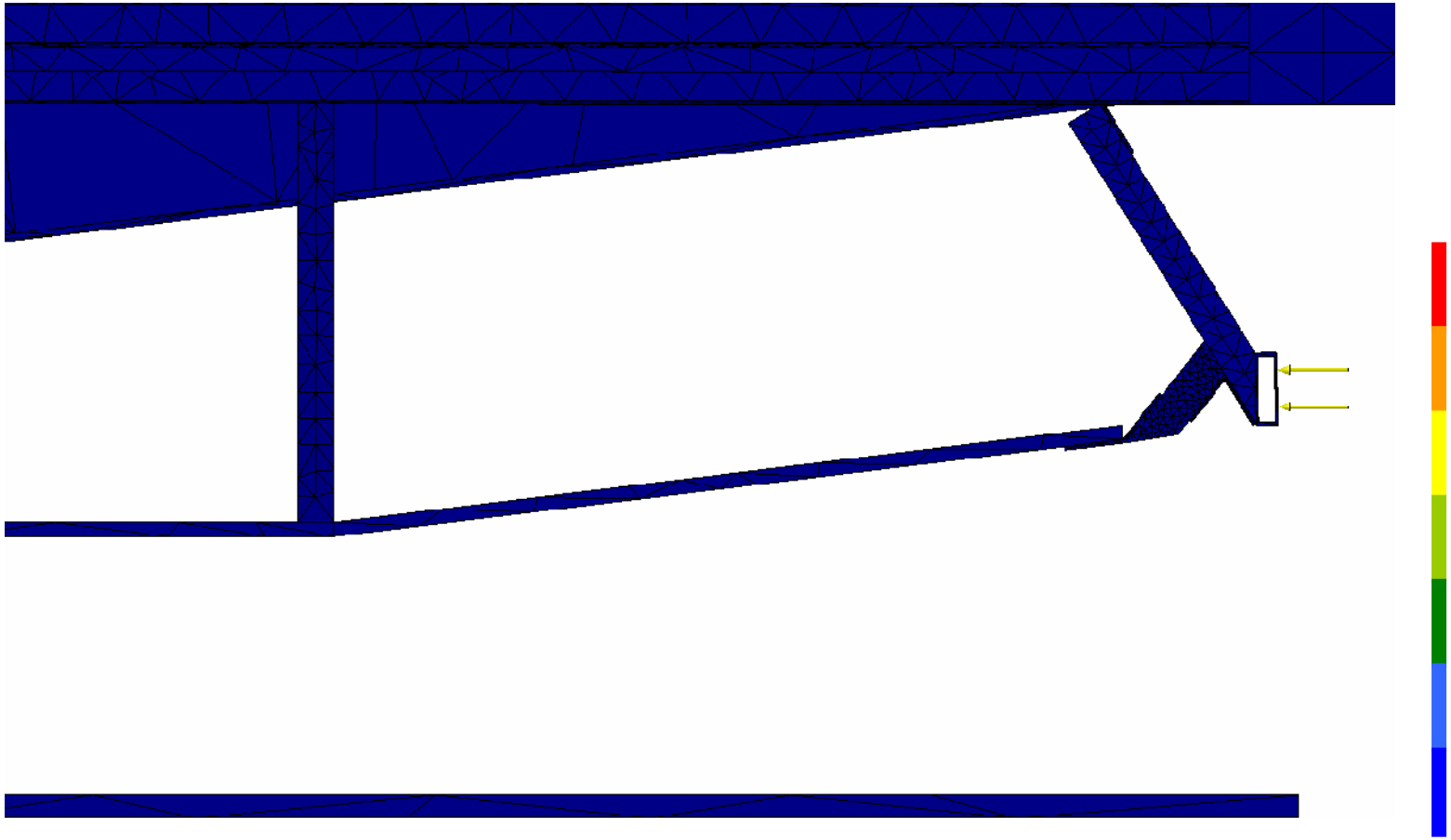
Disadvantages of the underride frame

- no equal load transmission
- frame bends off
- massive and heavy frame necessary

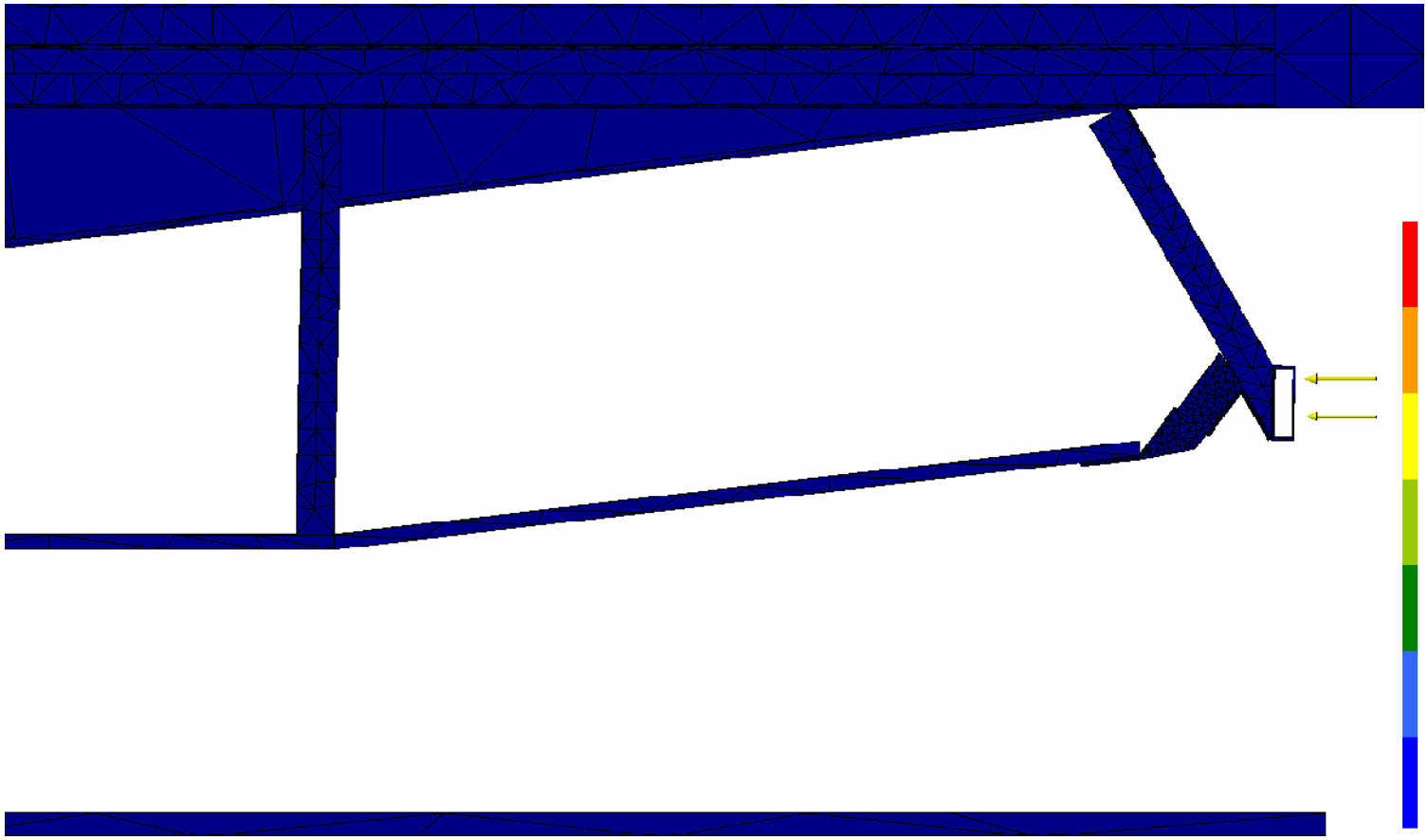
Advantages of the underride slab with an outside frame

- equal load transmission
- no frame bending
- light weight construction of the frame possible

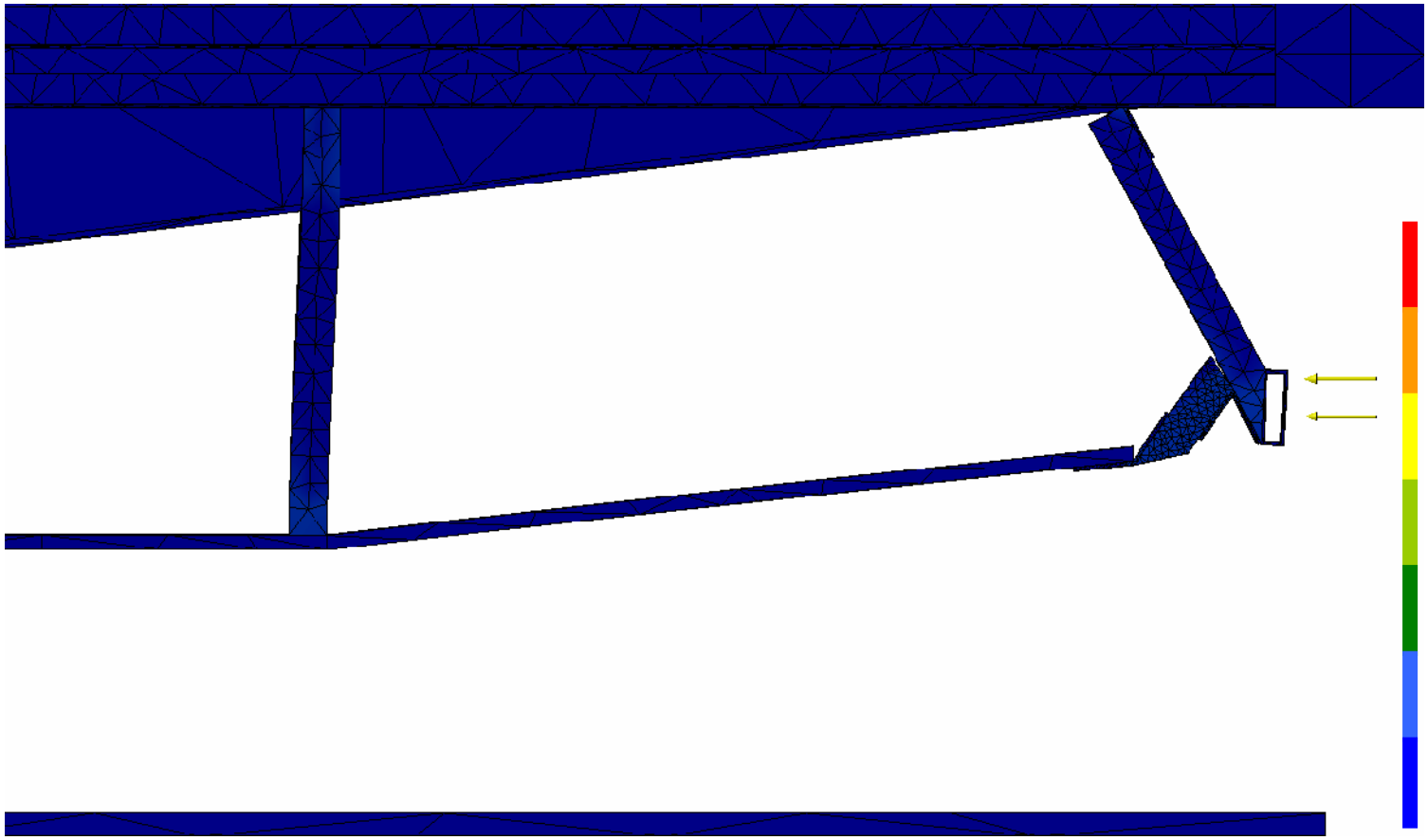
10 t static load at $T_{0,}$ starting position



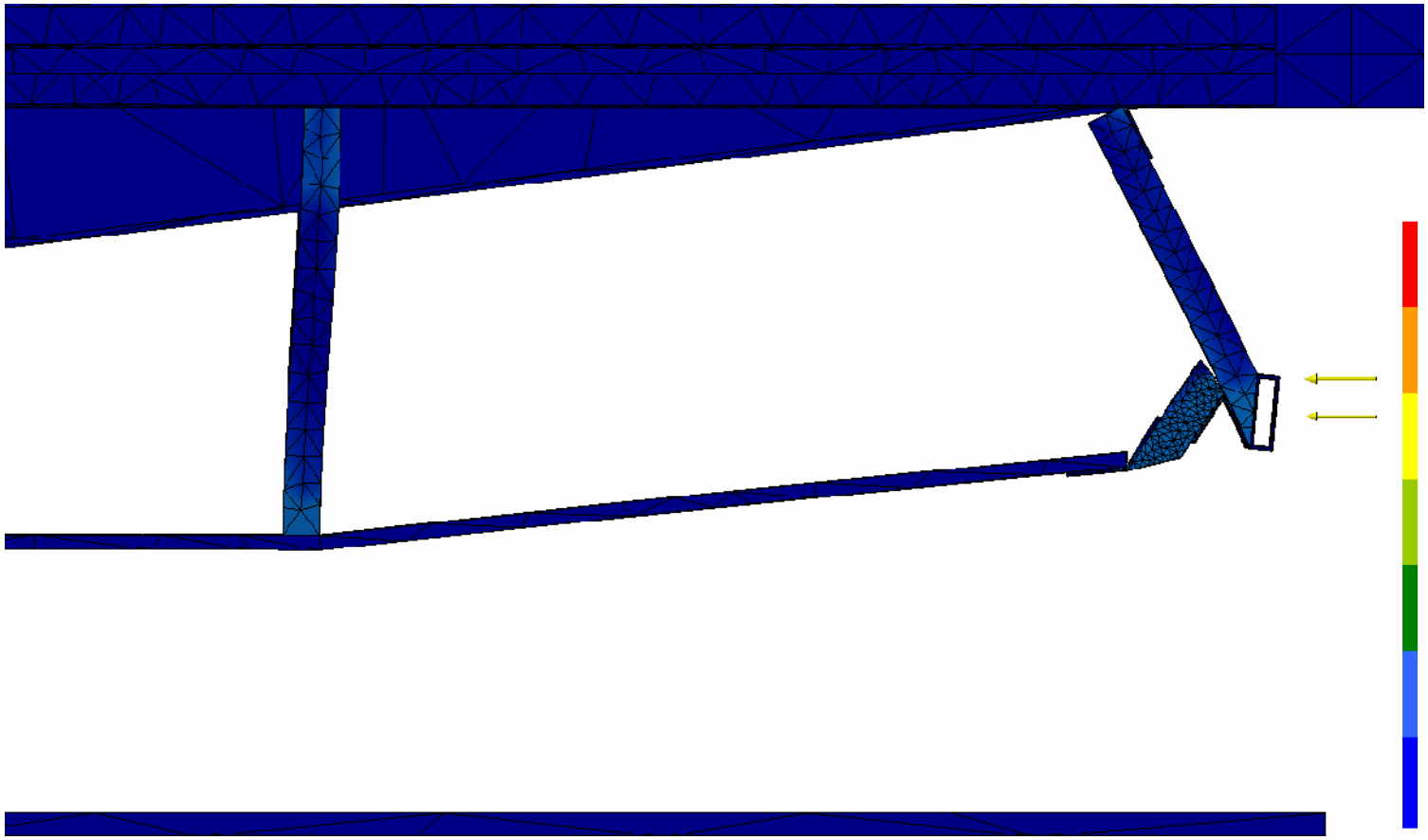
10 t static load at T_1



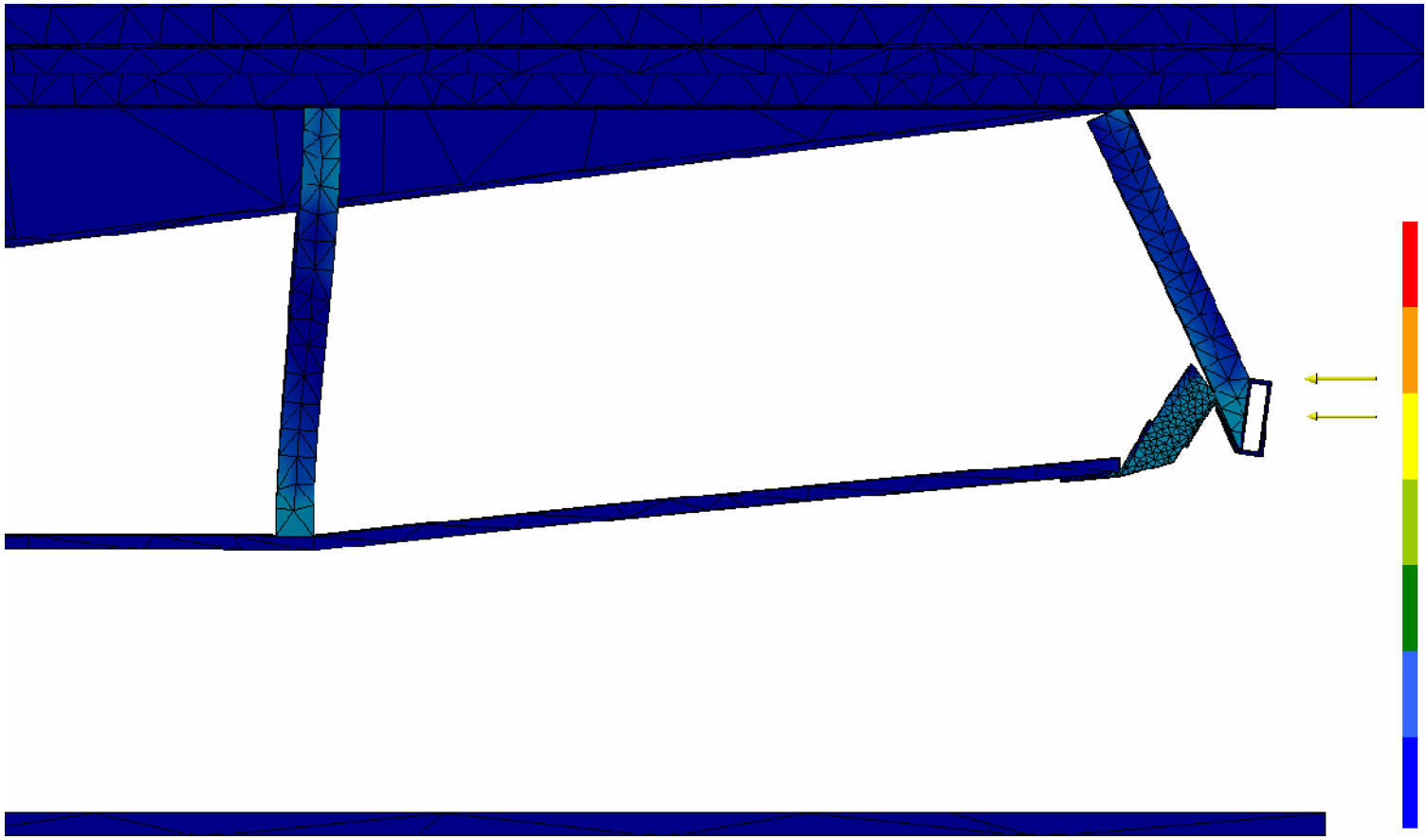
10 t static load at T_2



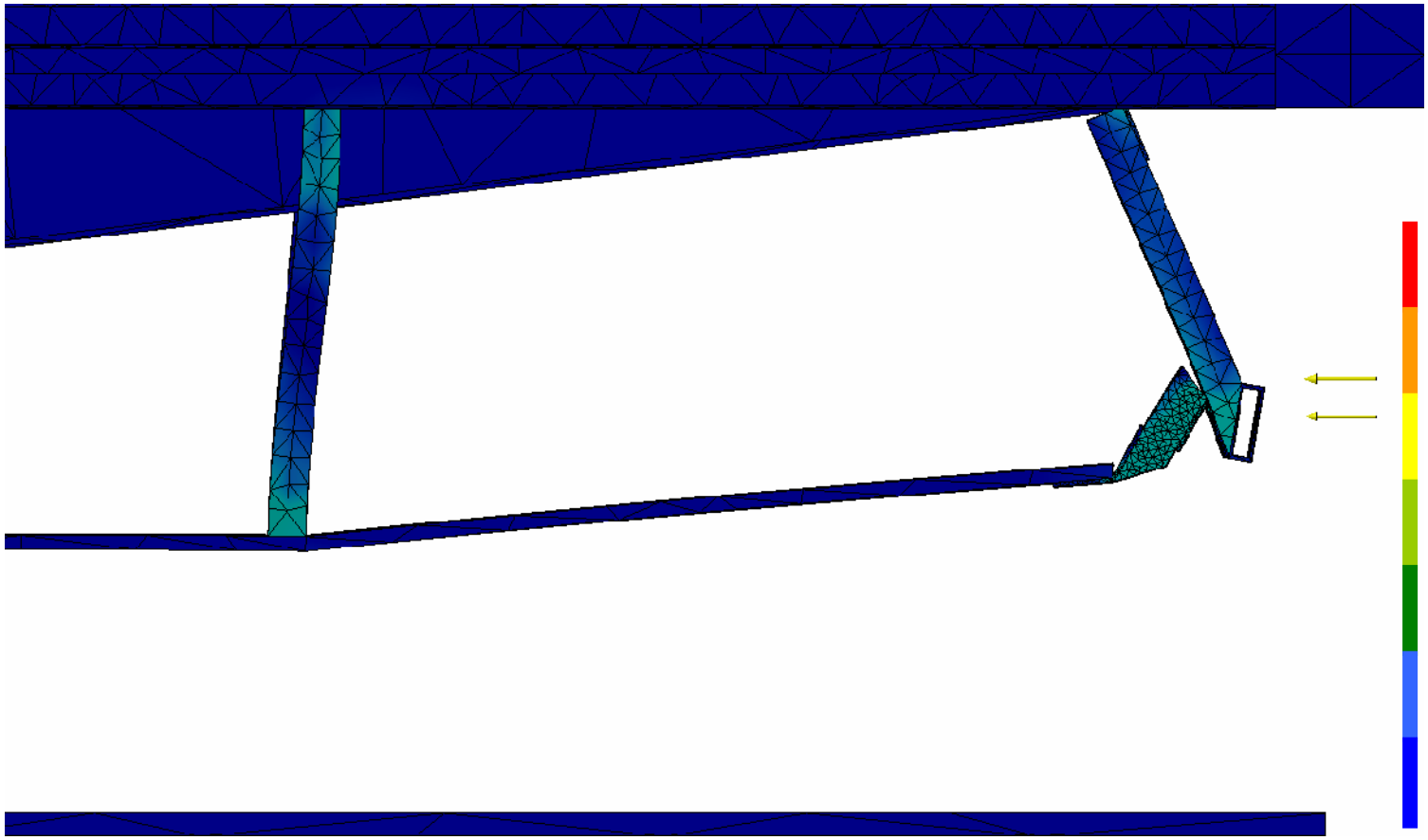
10 t static load at T_3



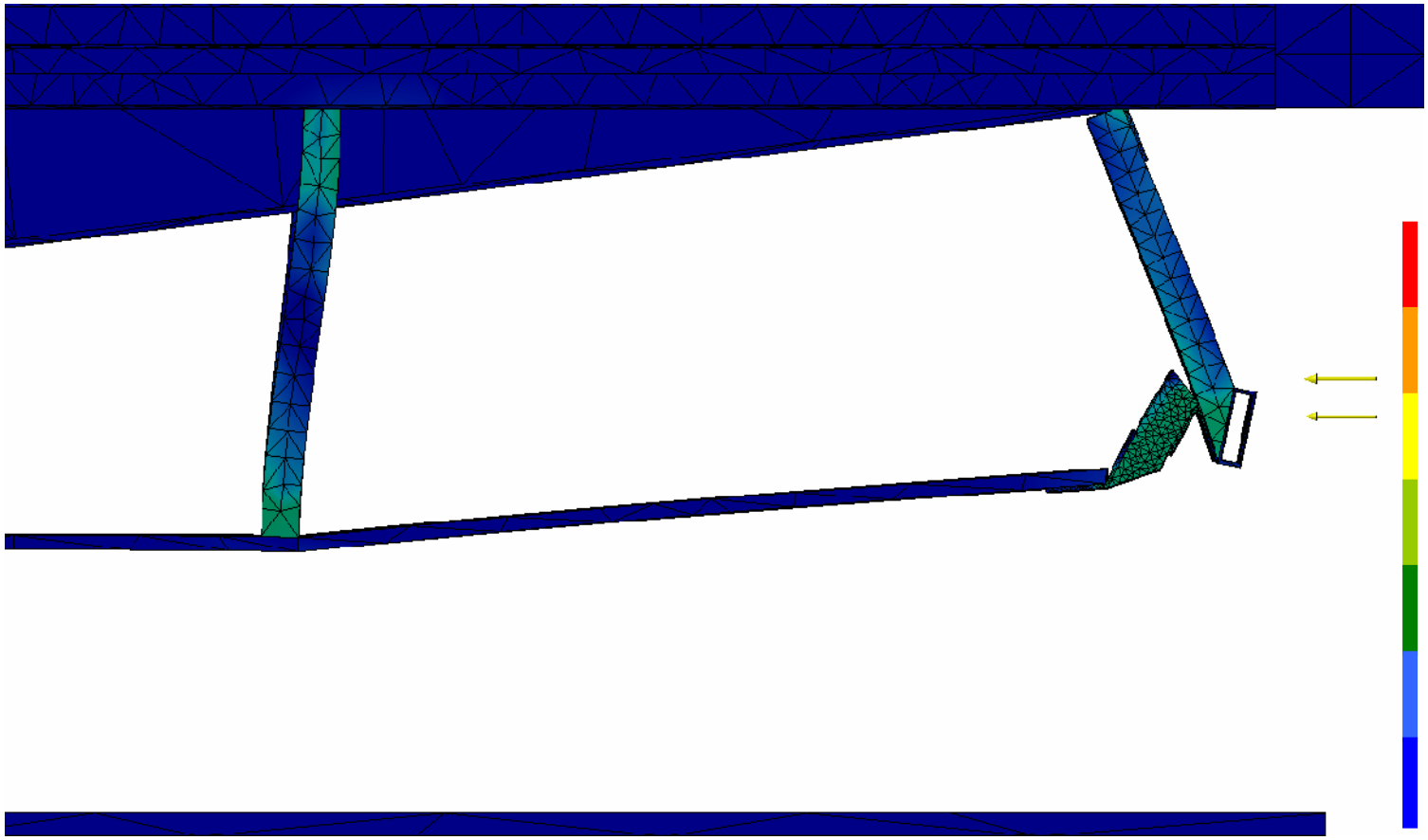
10 t static load at T_4



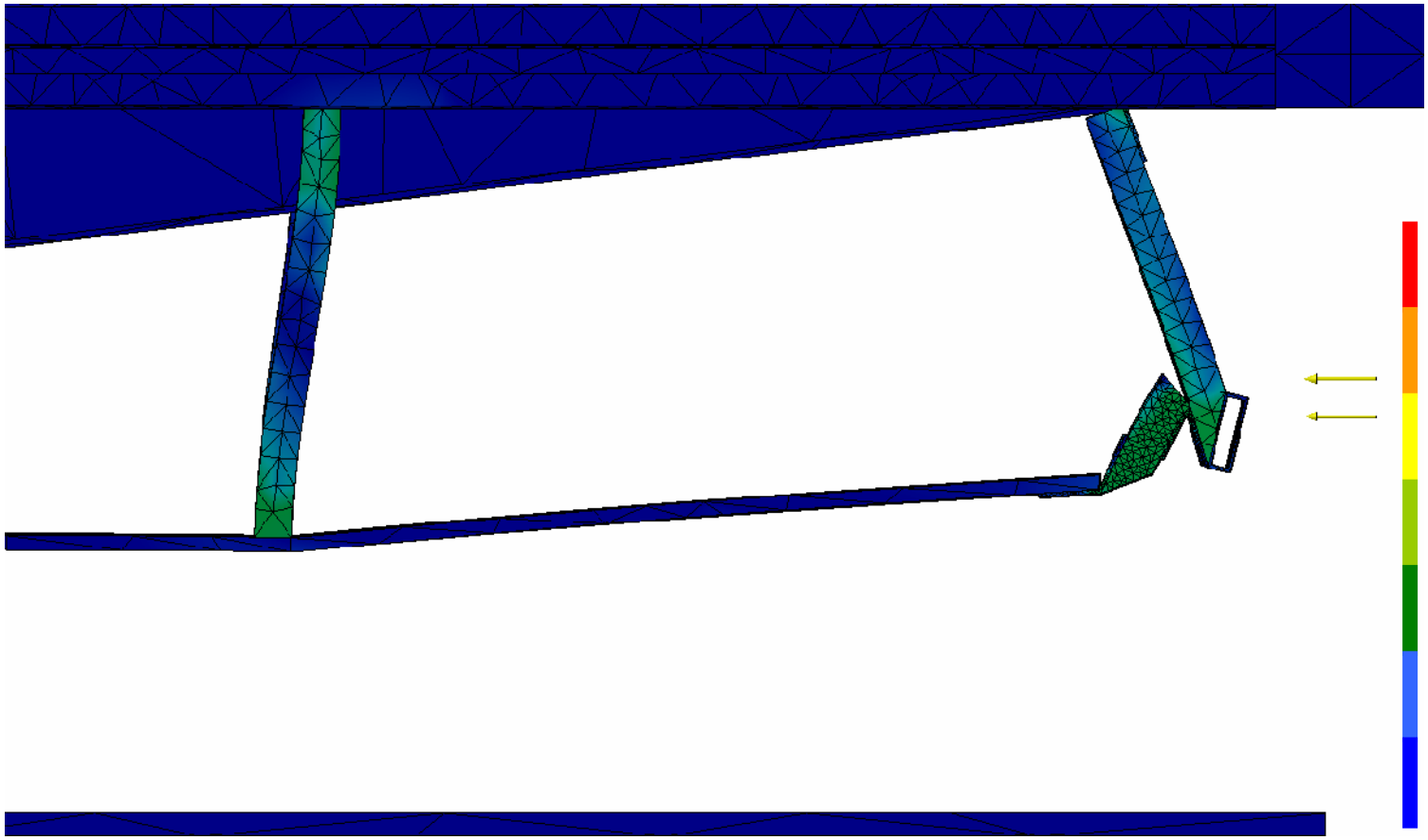
10 t static load at T_5



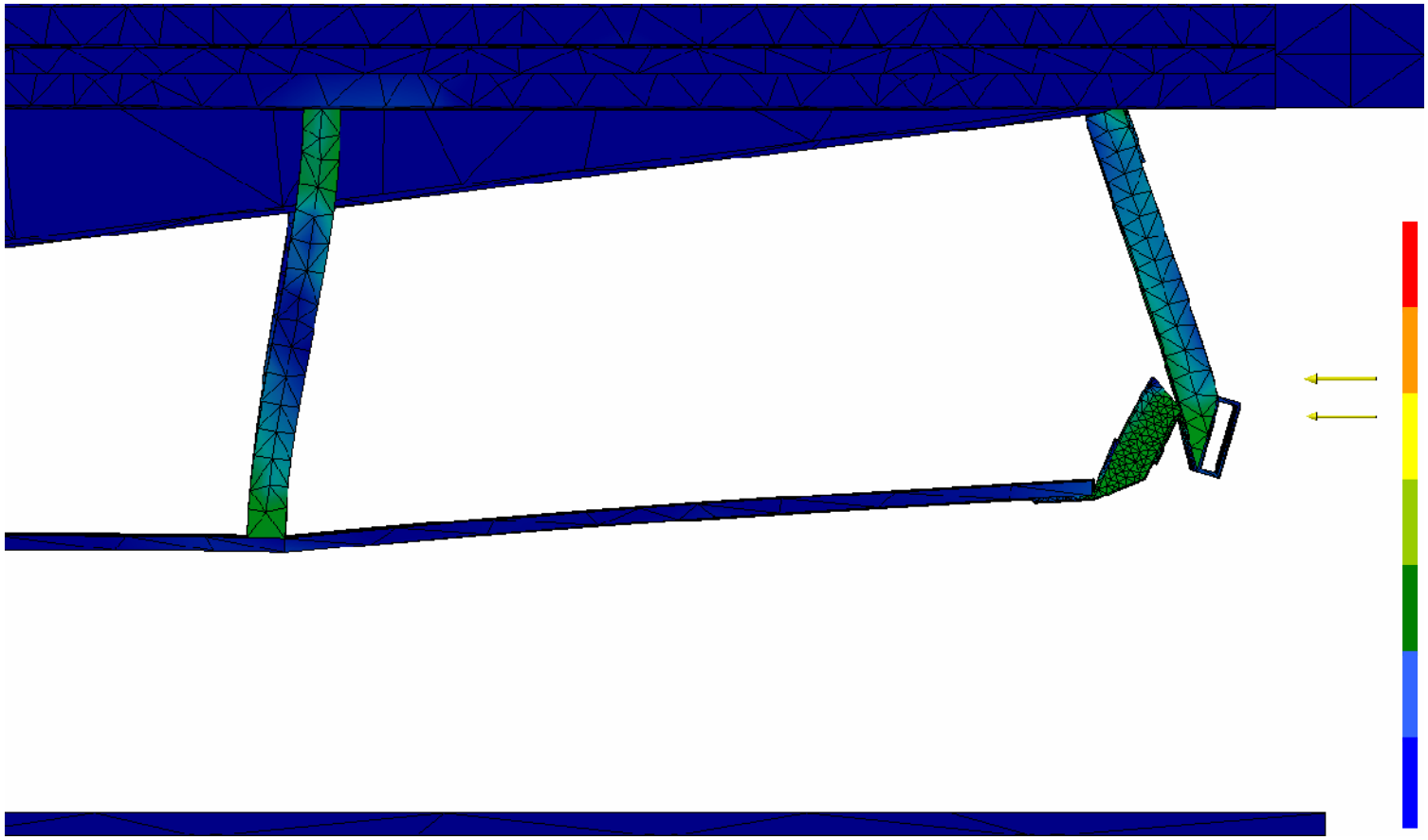
10 t static load at T_6



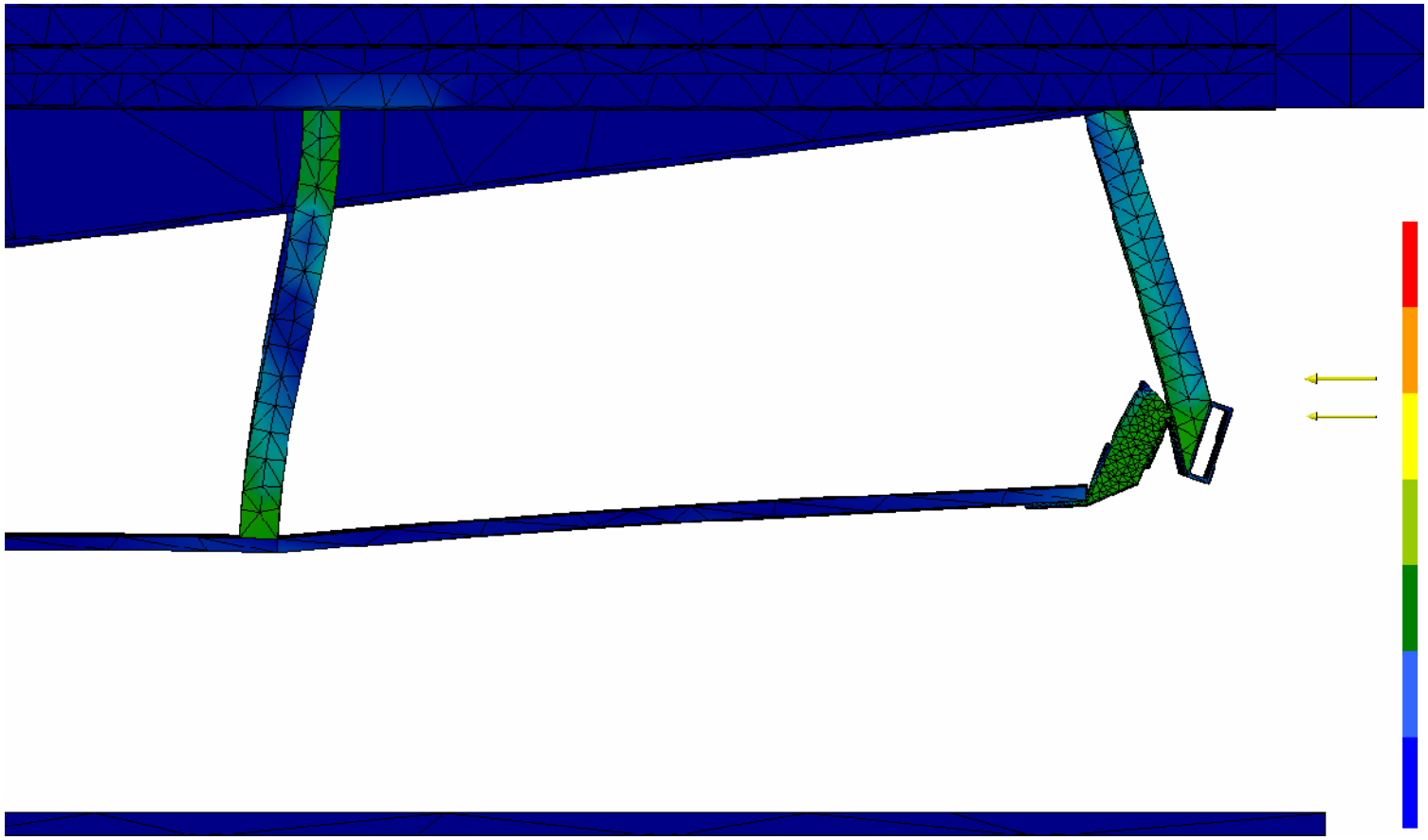
10 t static load at T_7



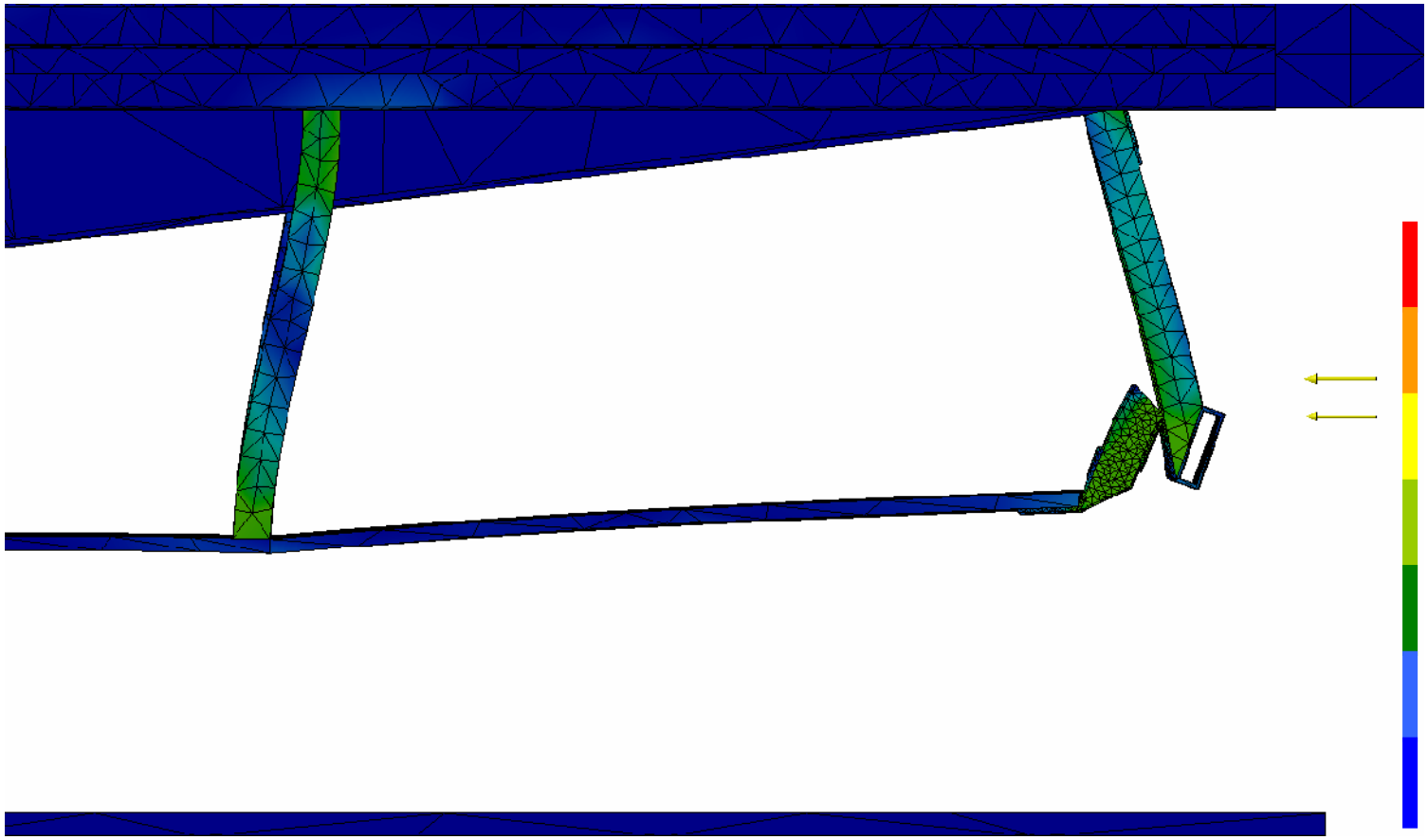
10 t static load at T_8



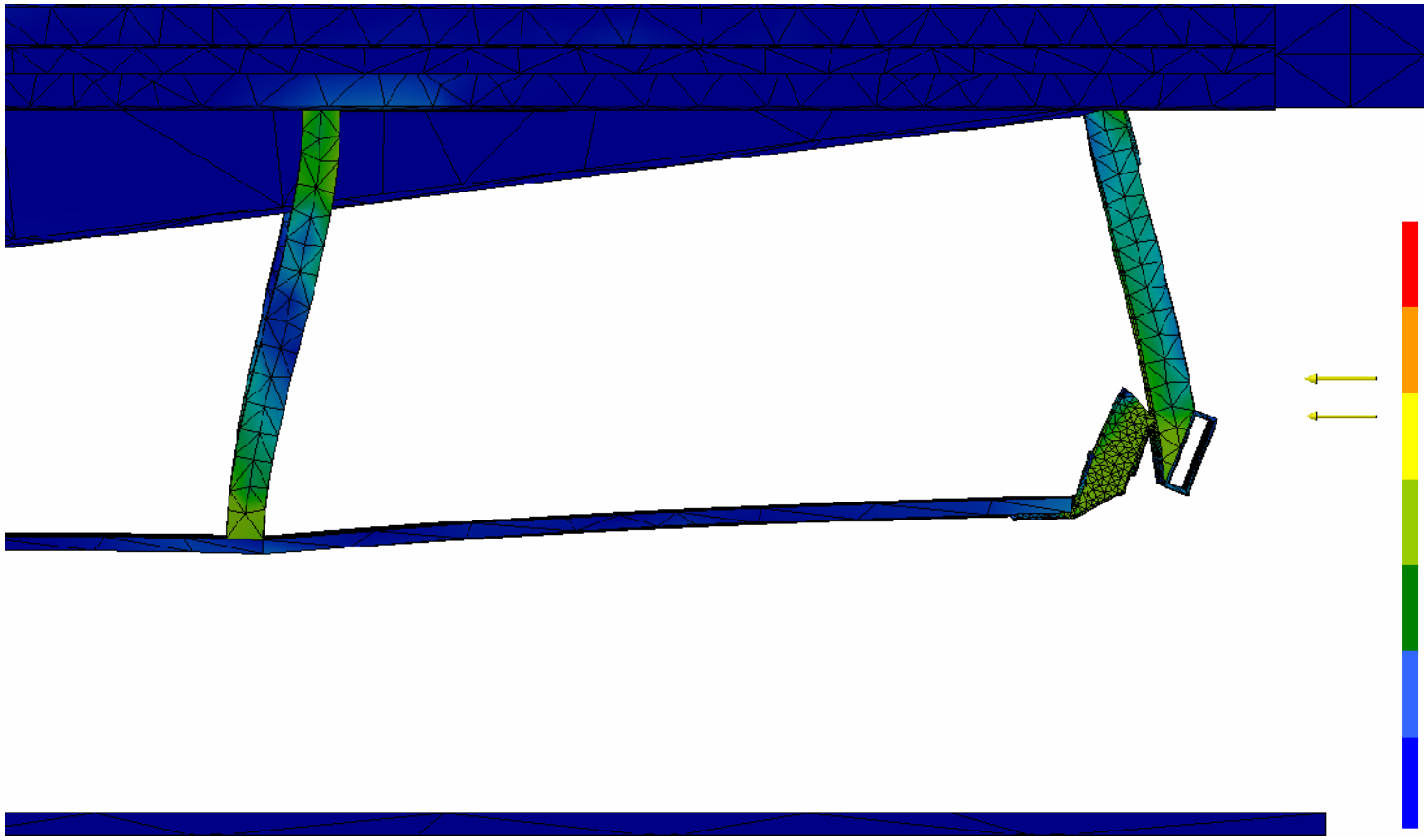
10 t static load at T_9



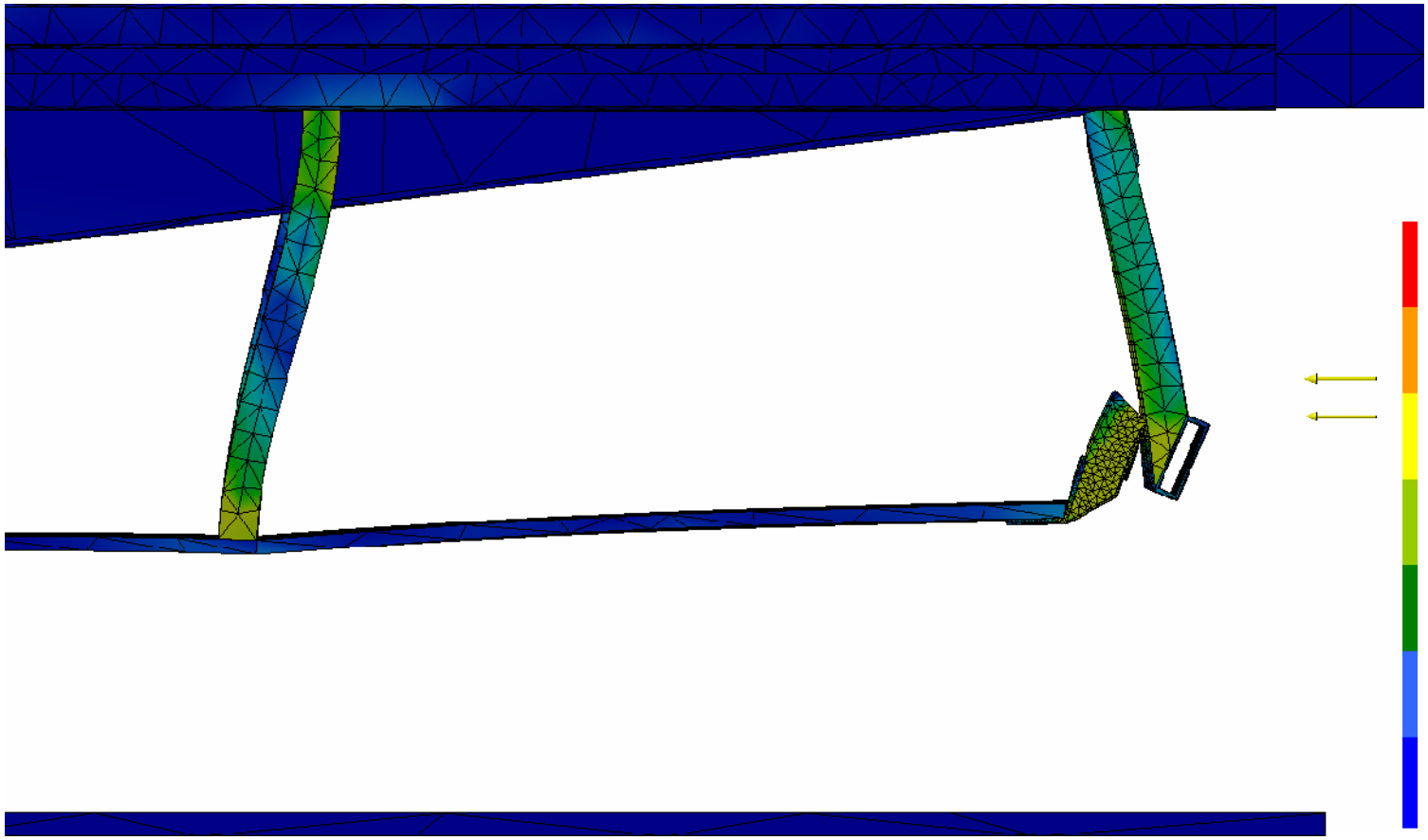
10 t static load at T_{10}



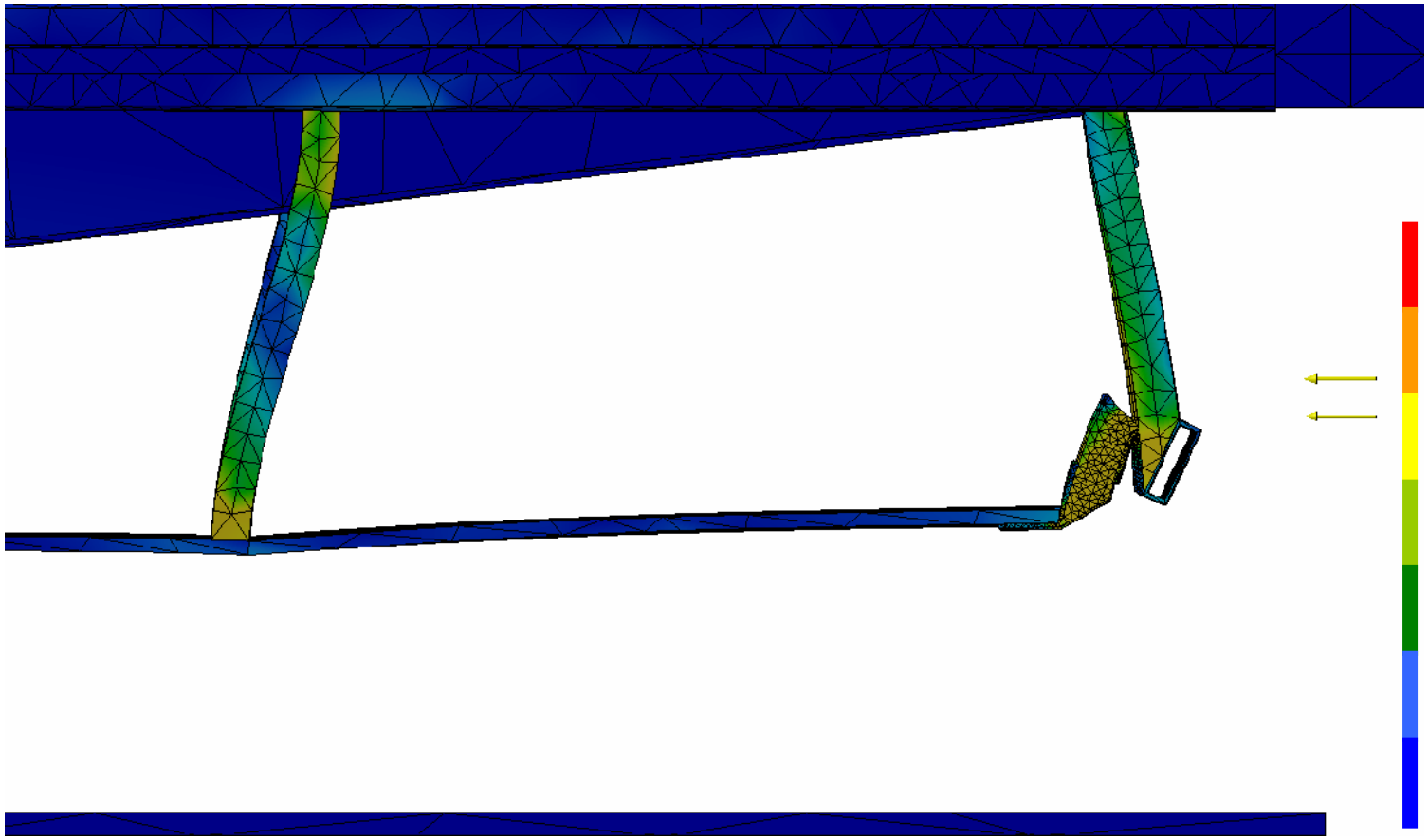
10 t static load at T_{11}



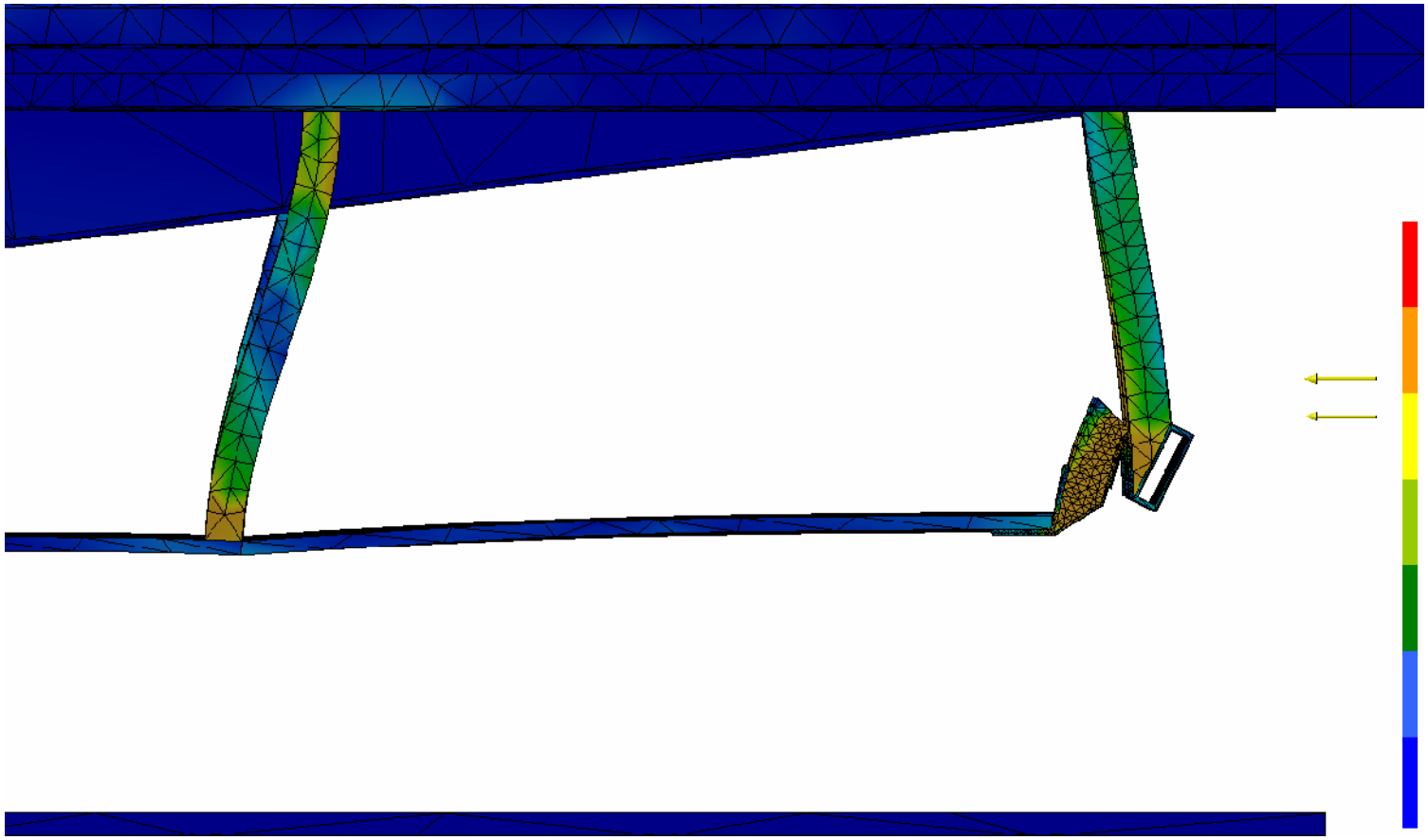
10 t static load at T_{12}



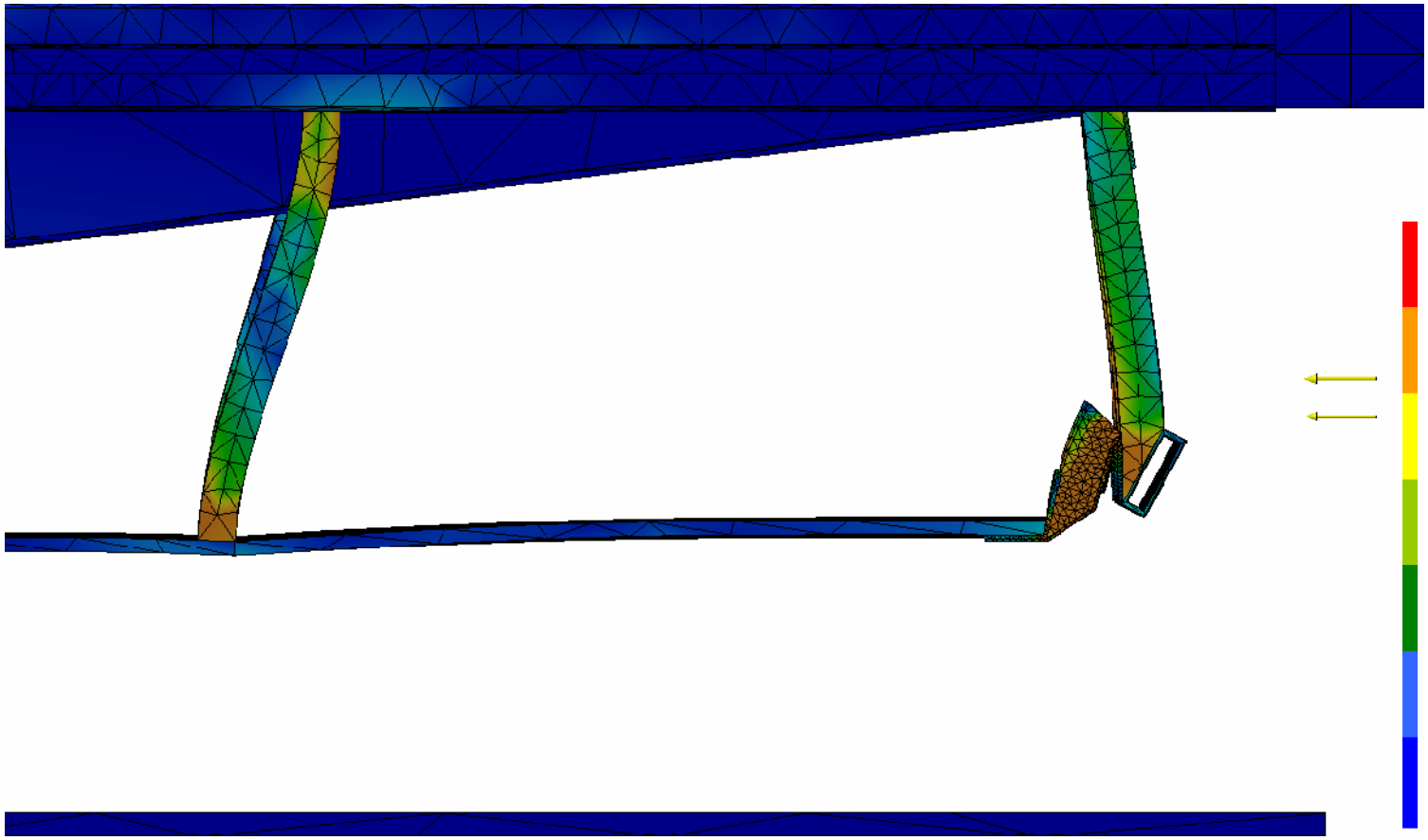
10 t static load at T_{13}



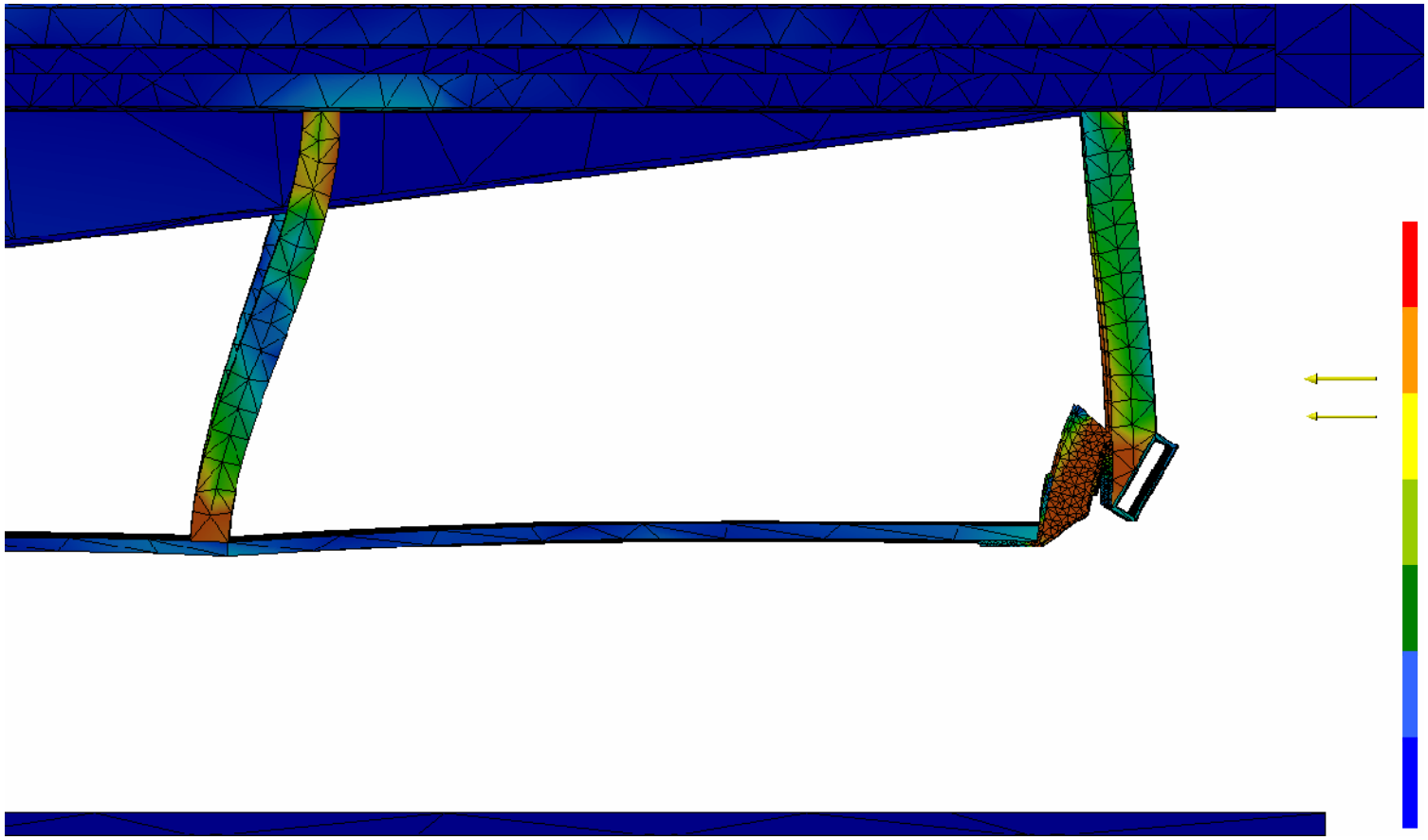
10 t static load at T_{14}



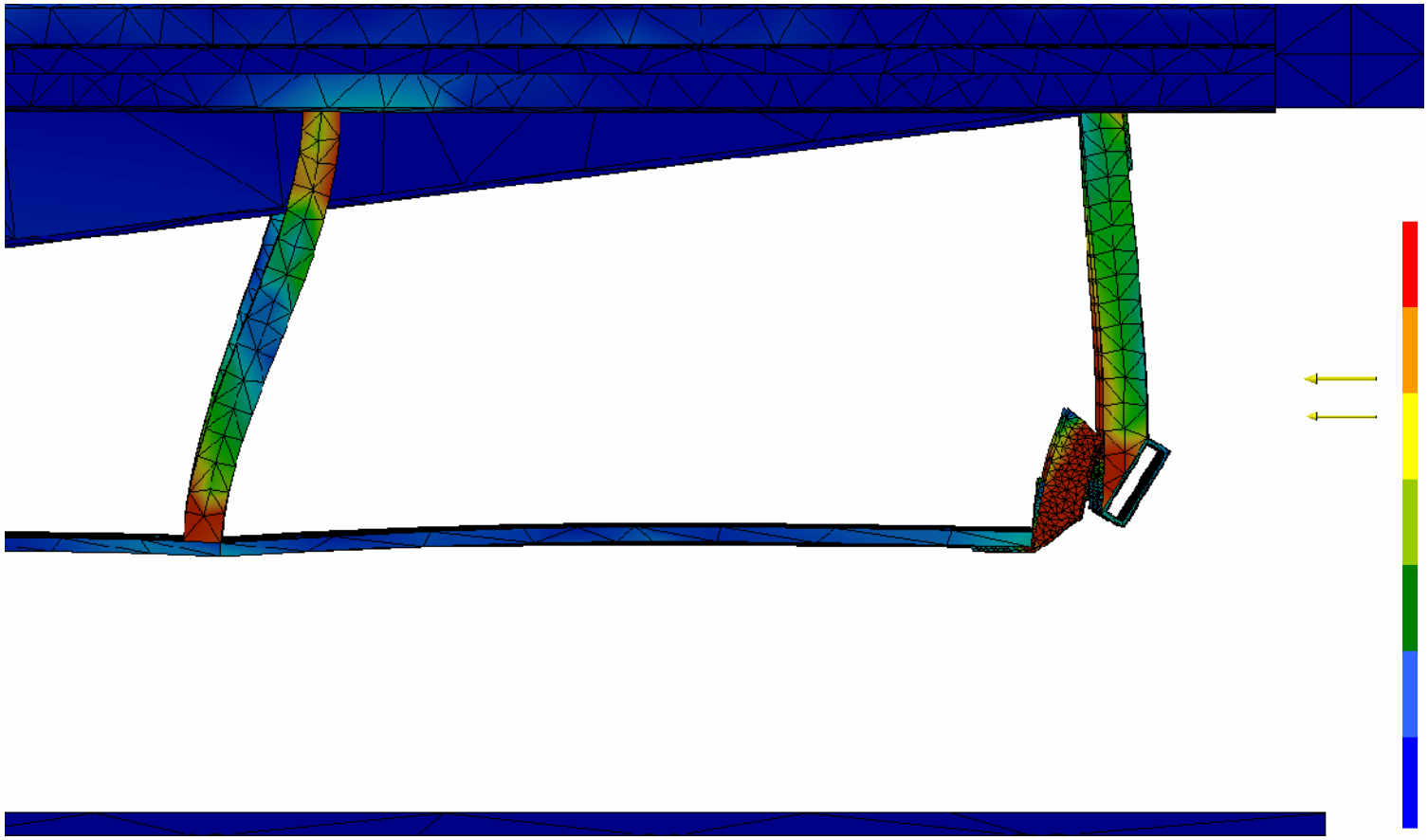
10 t static load at T_{15}



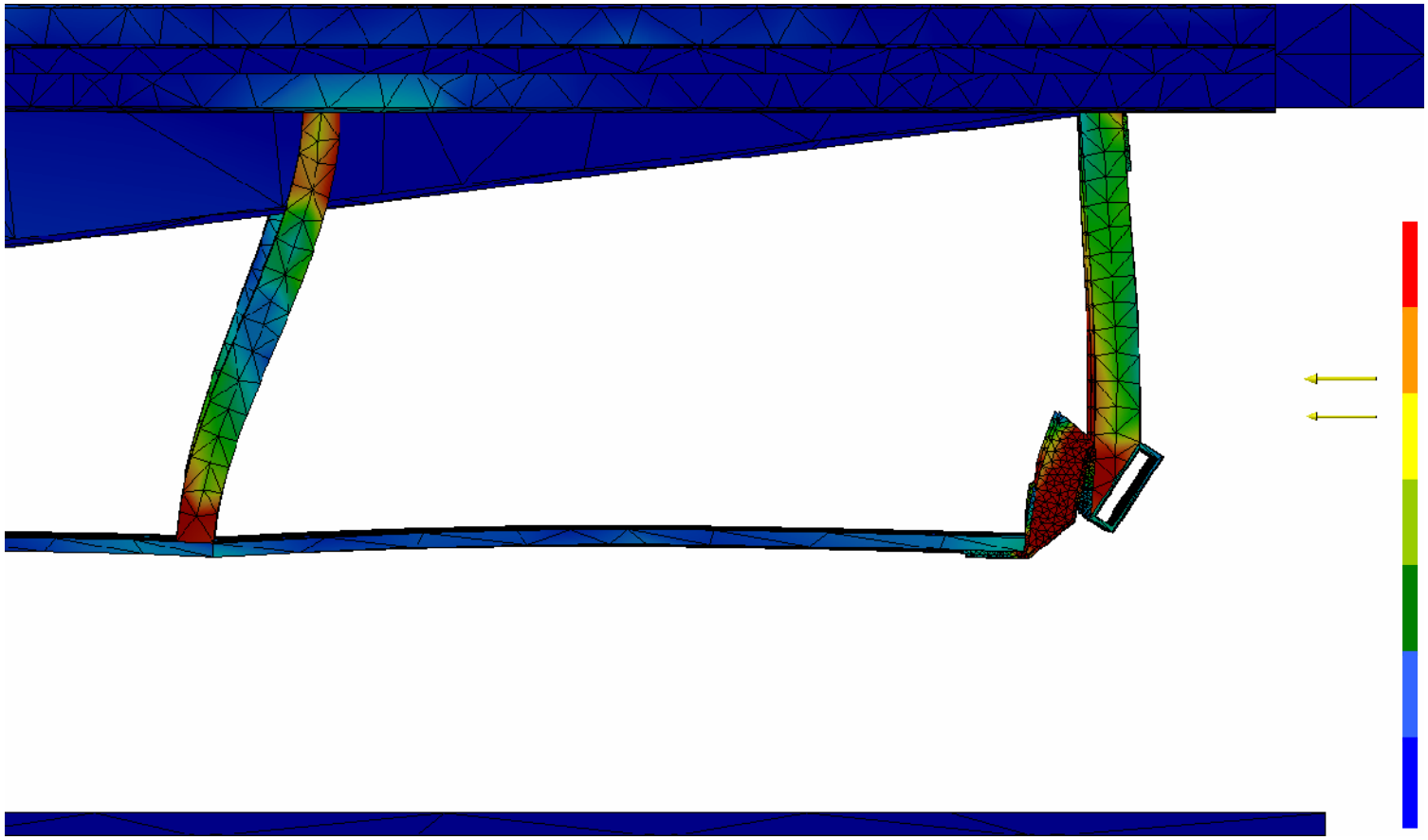
10 t static load at T_{16}



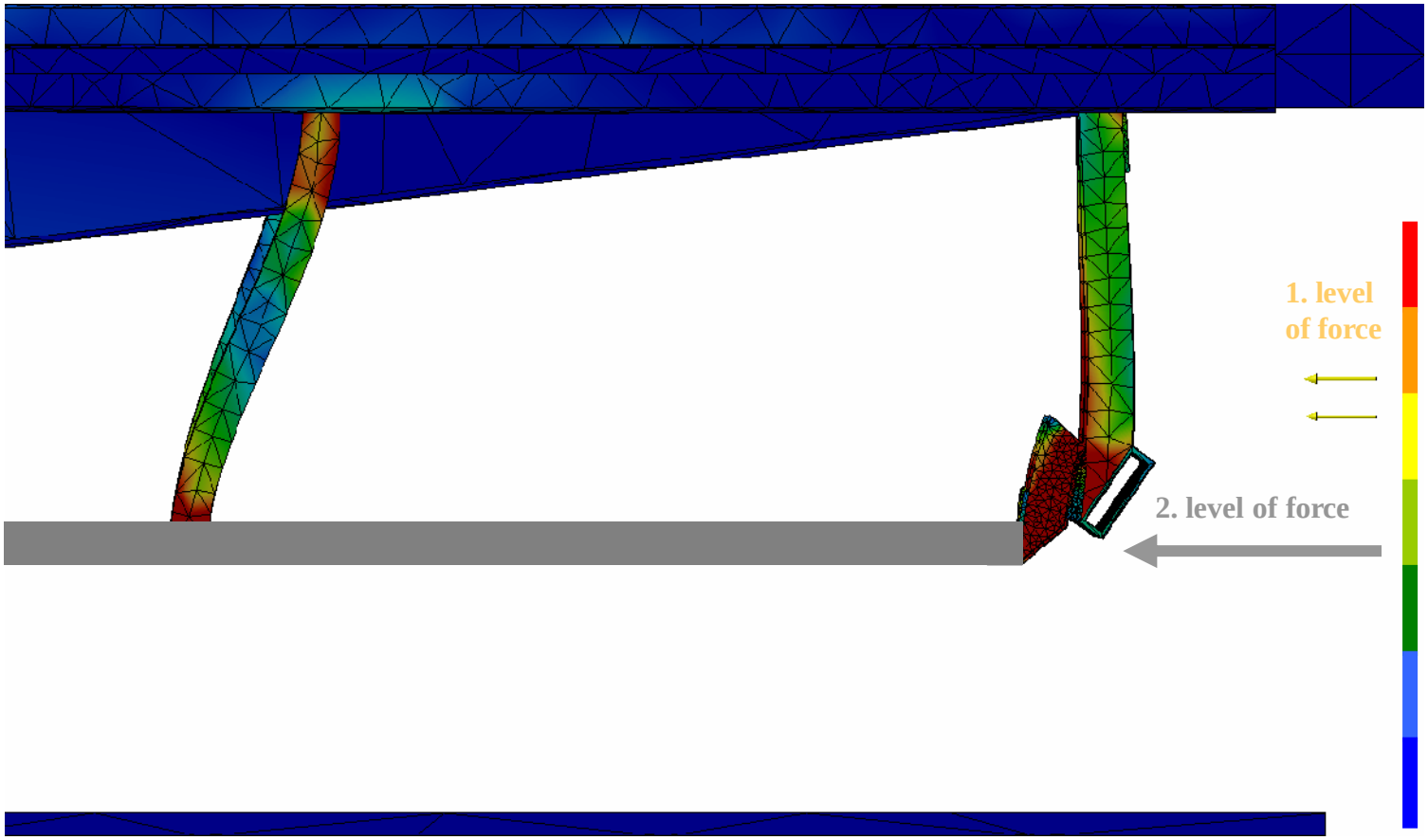
10 t static load at T_{17}



10 t static load at T_{18}



10 t static load at $T_{19,}$ Endposition

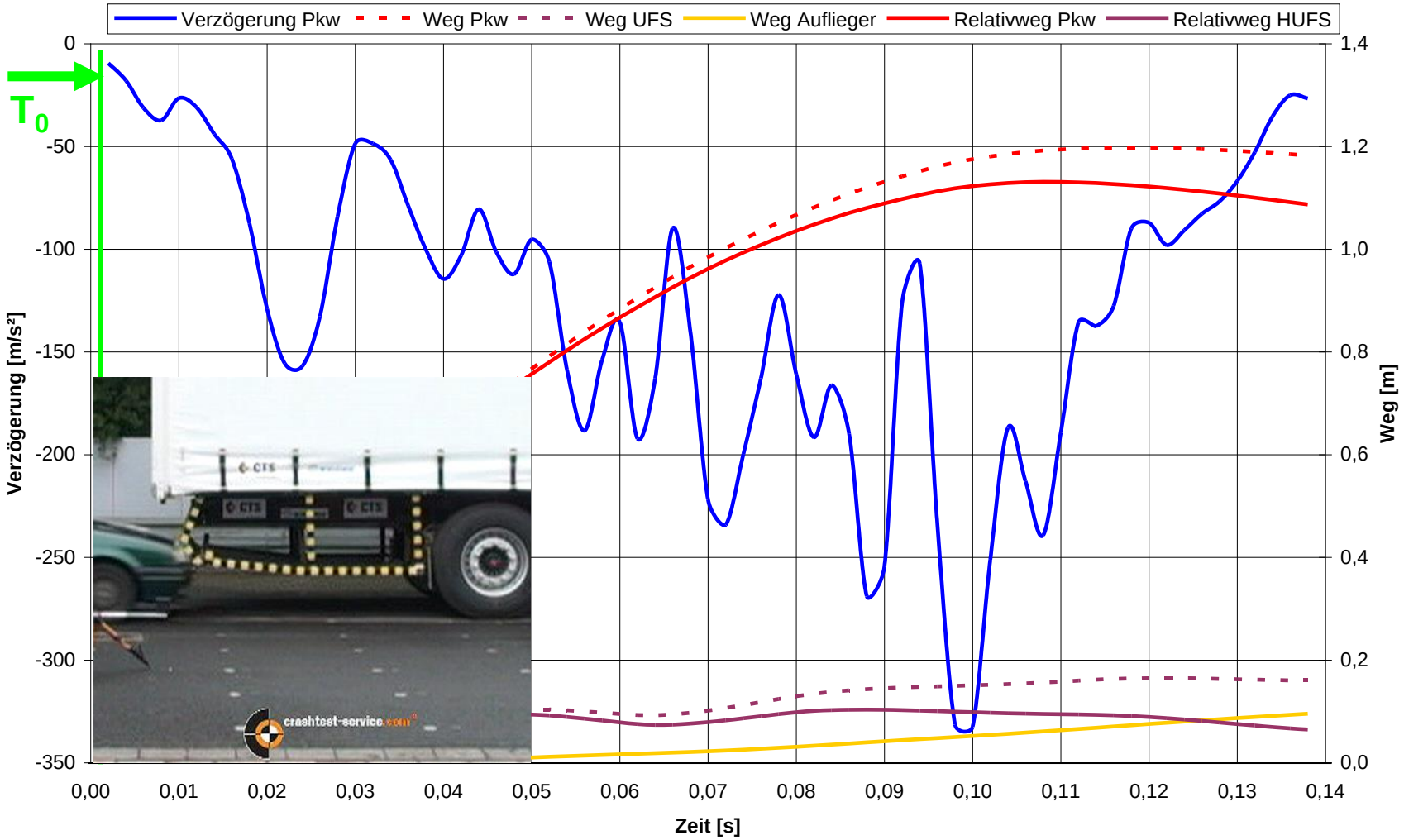


Conventional Underride System, 60km/h, Renault 19, Krone Profiliner

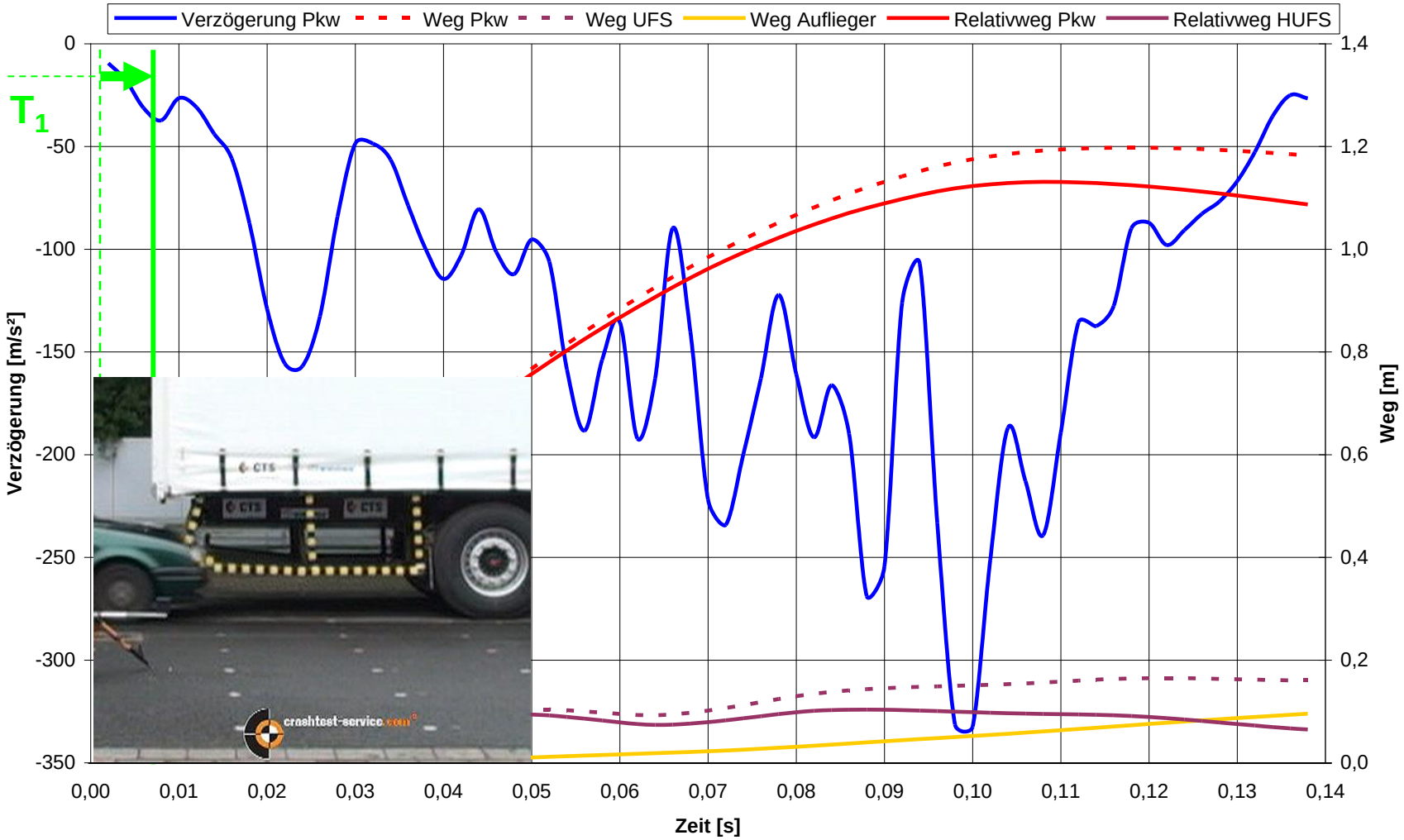
New constructed Underride System, 56km/h, Renault 19, Krone Profiliner

Comparison, 60/56,5km/h, conventional / DKH-System

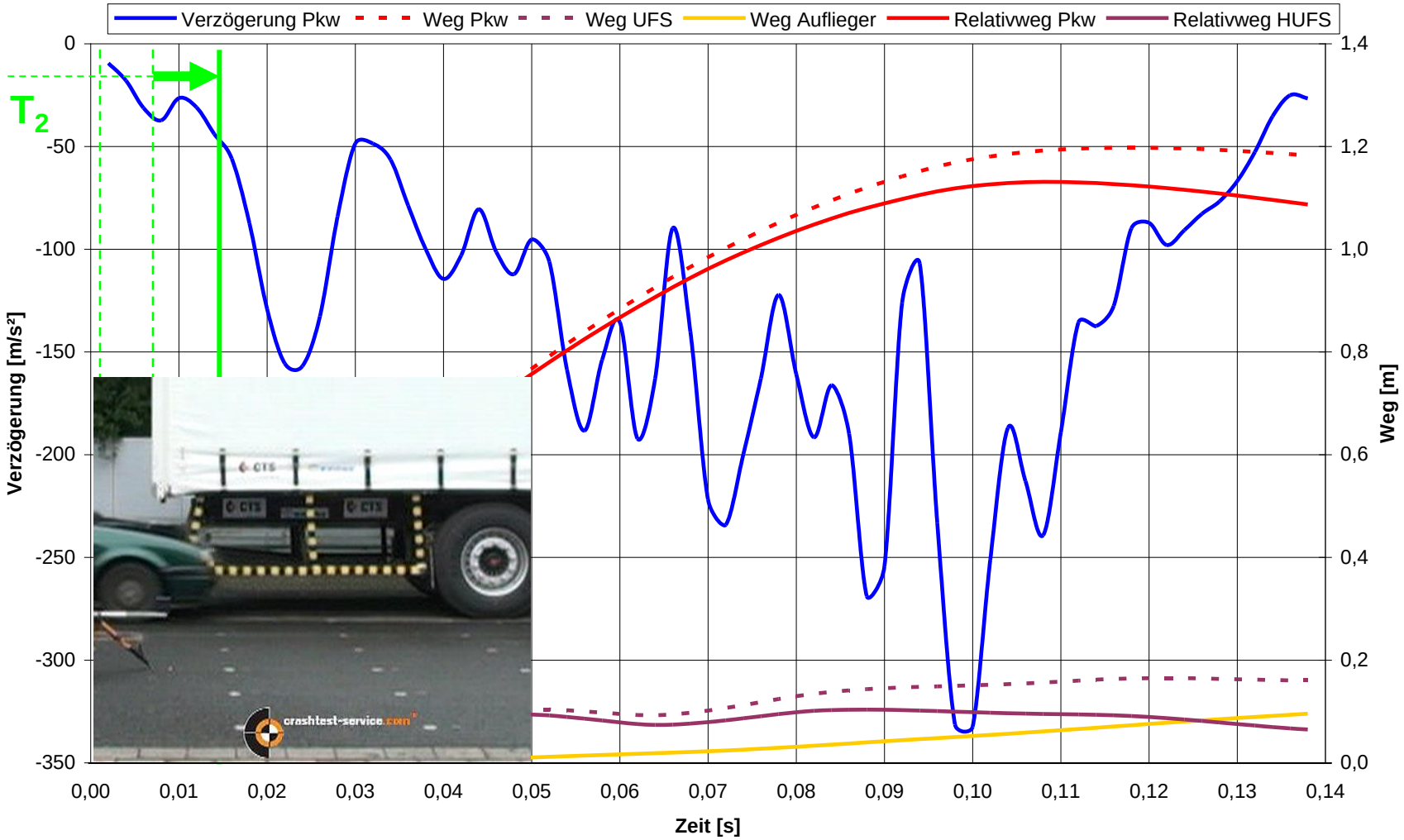
Impact Starting Point



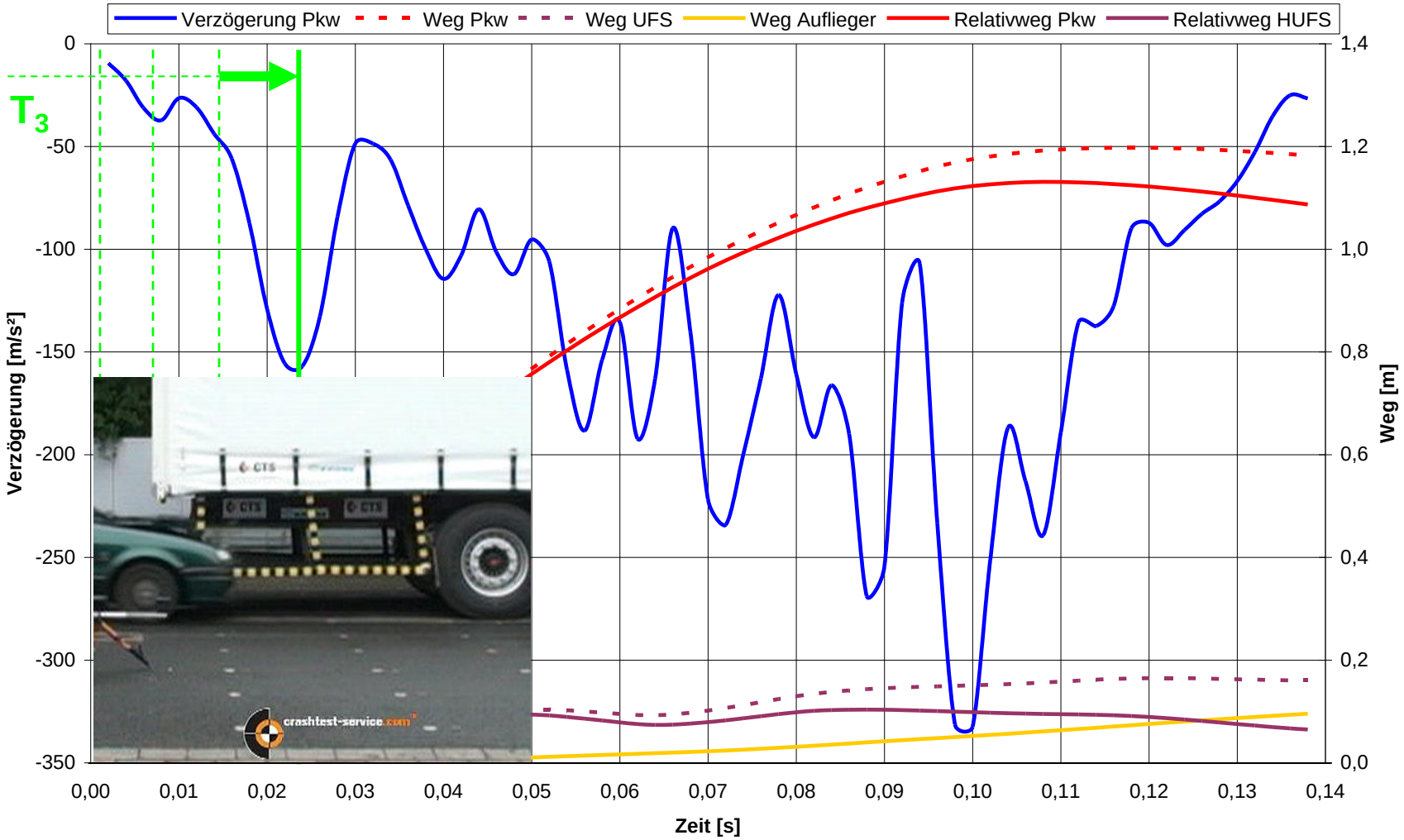
The angle starts to bend



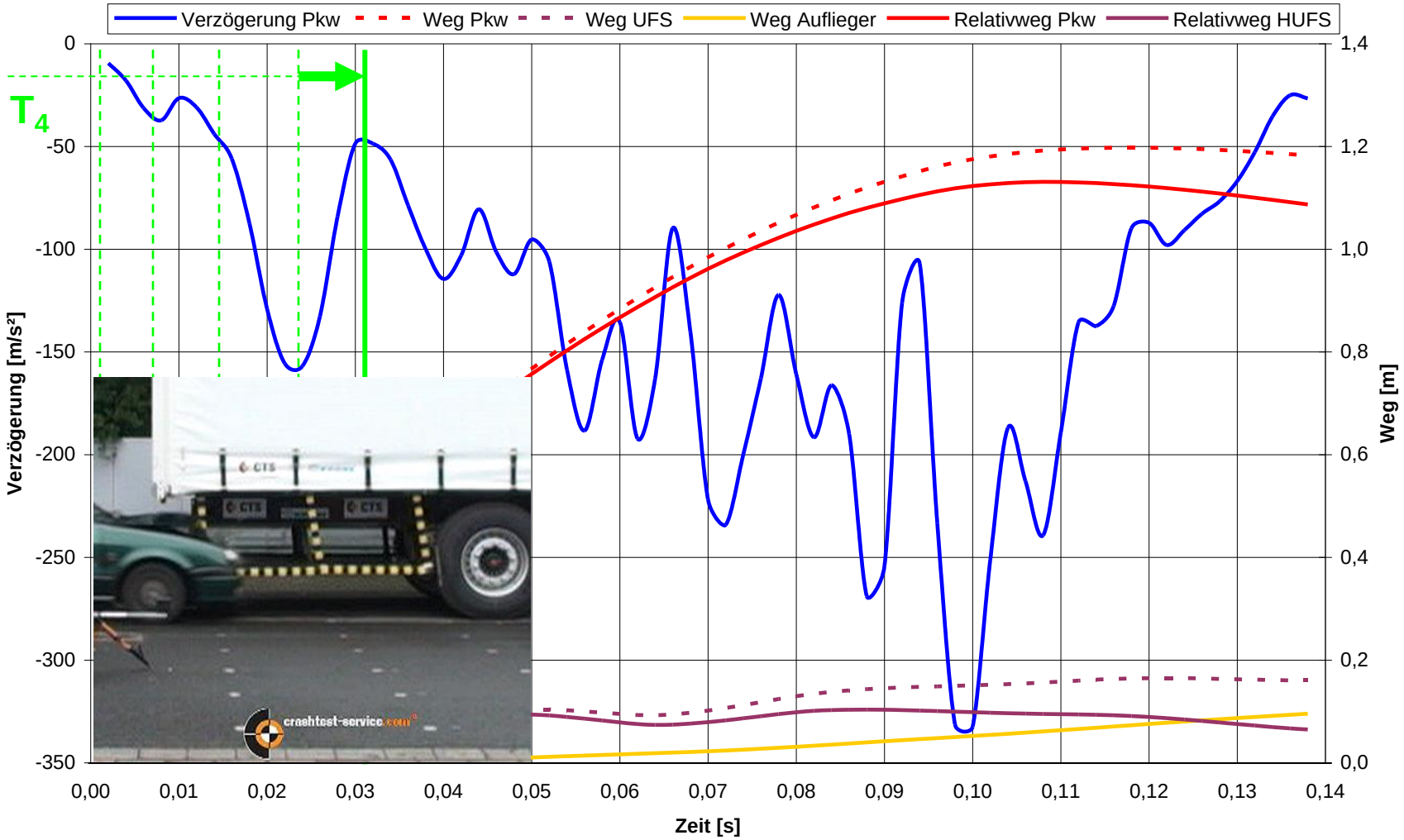
Slab in compatible height to the side member of the car



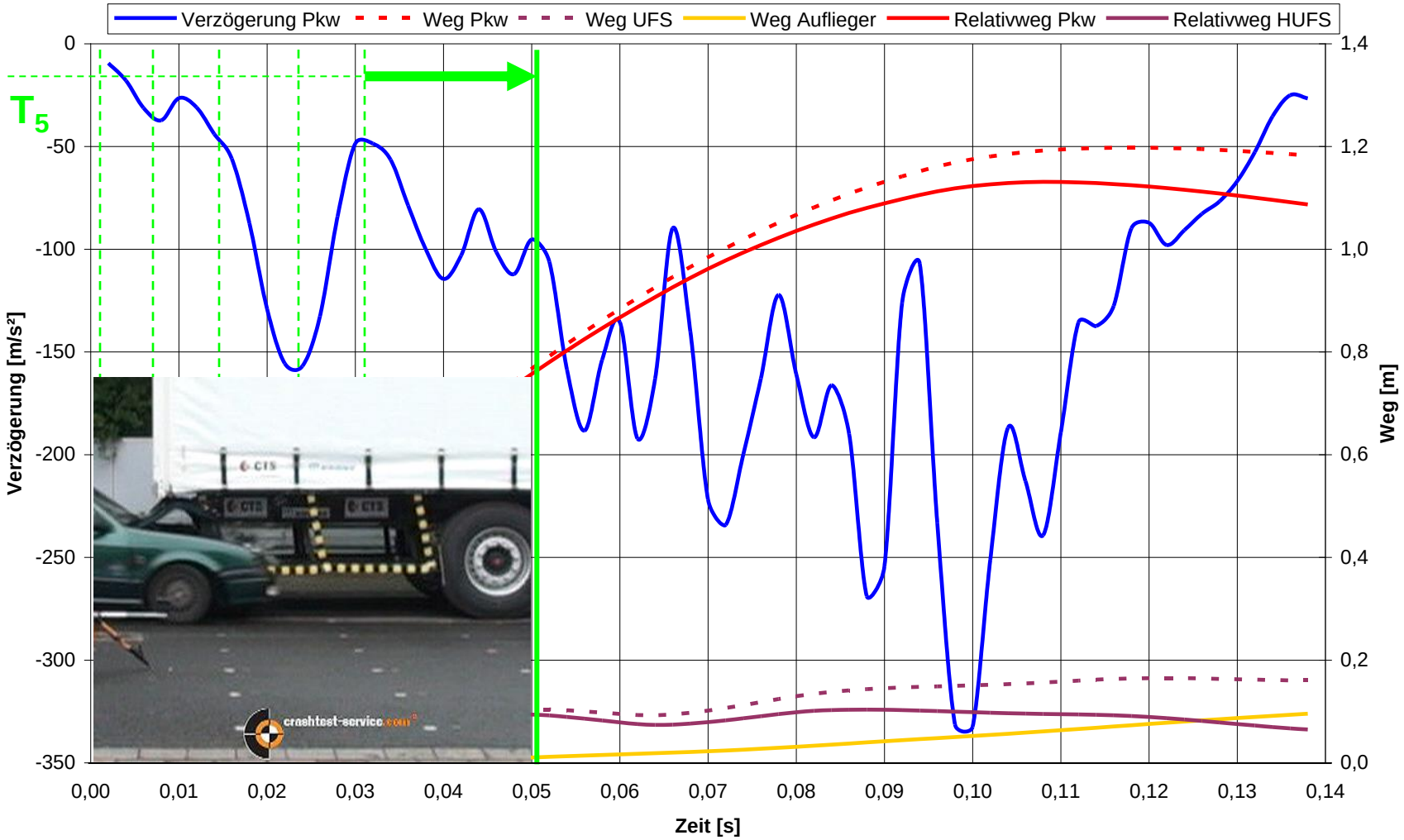
Movement of the whole system



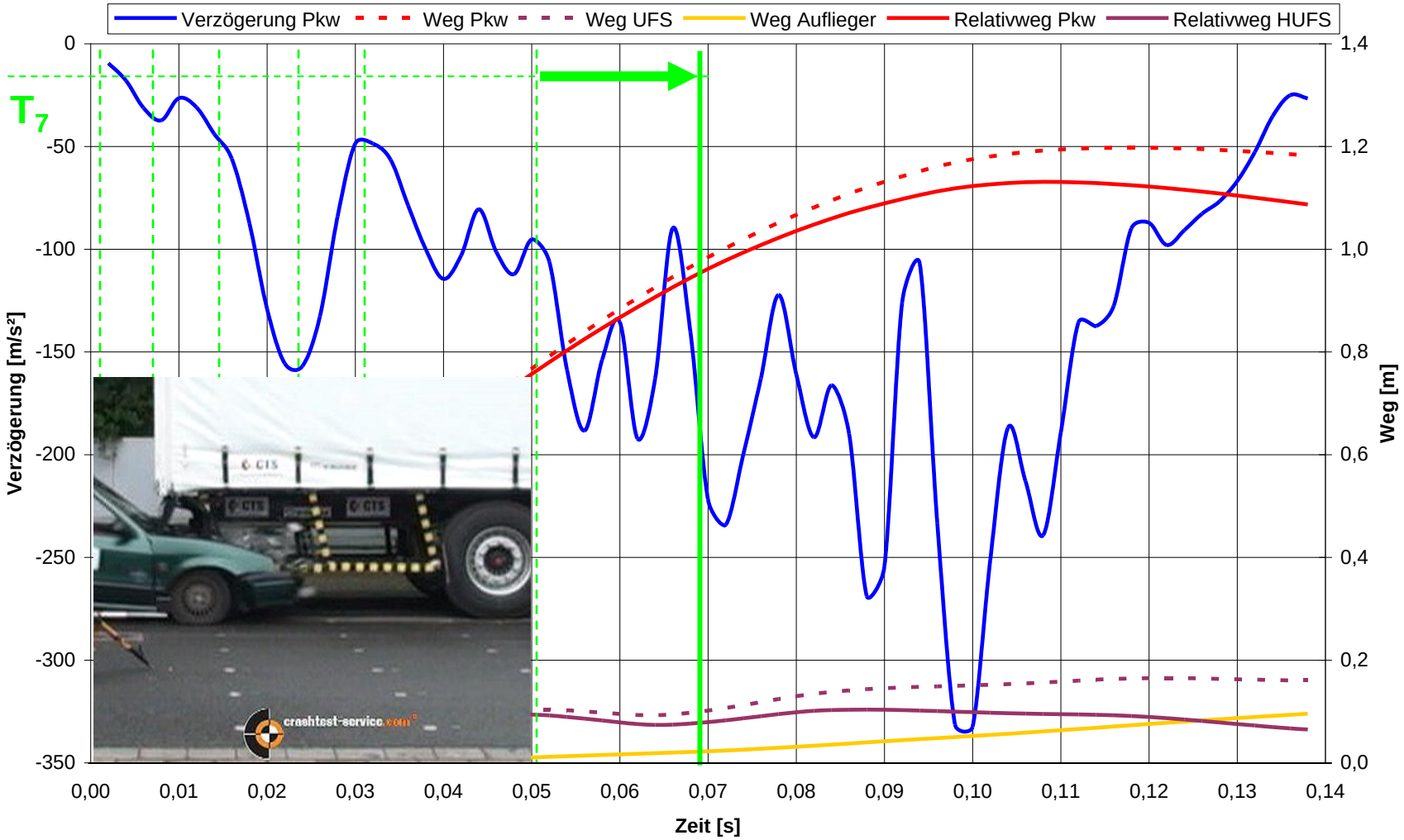
Contact point between the DKH-System and the wheels of the semi-trailer



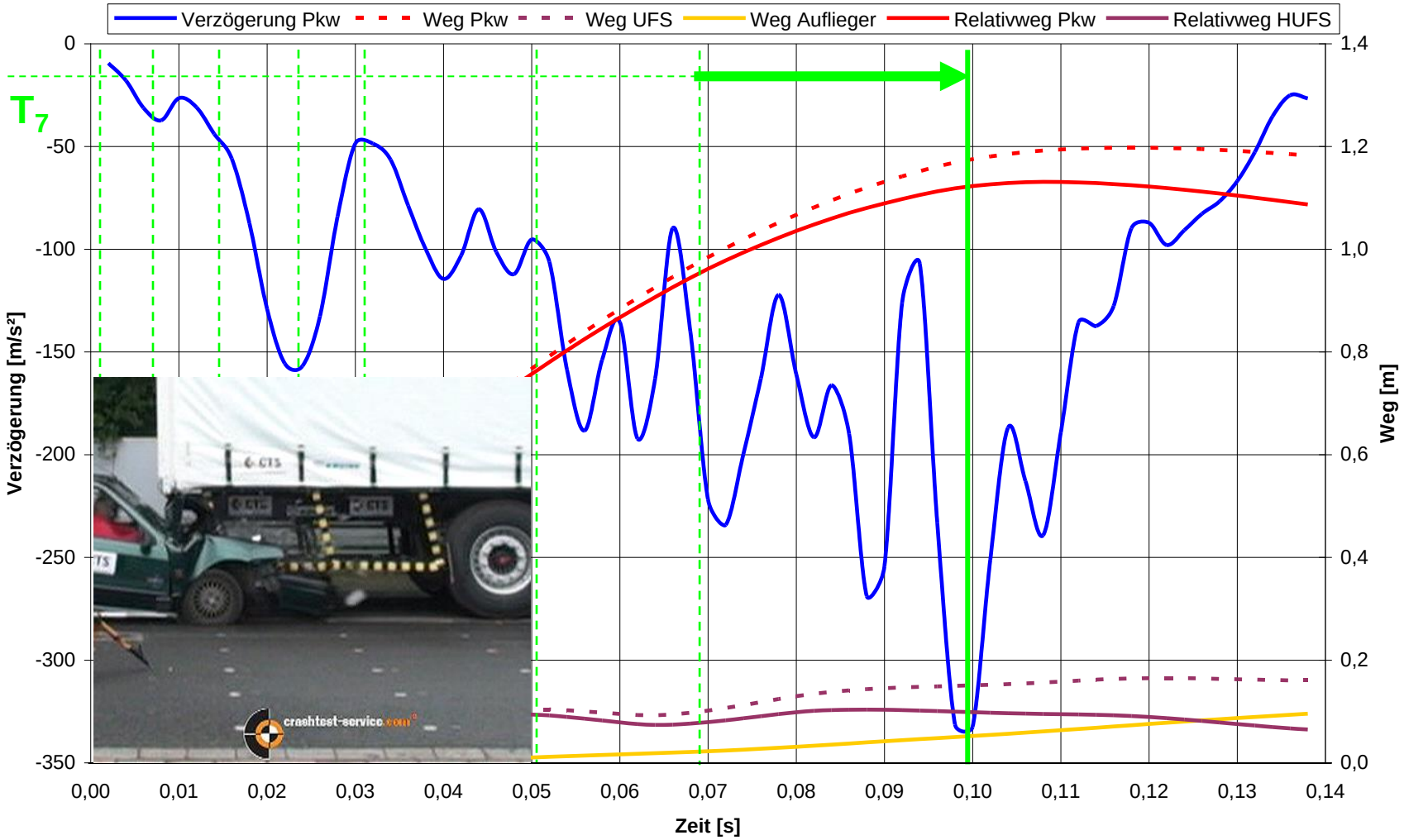
Increase of the wheel pressure



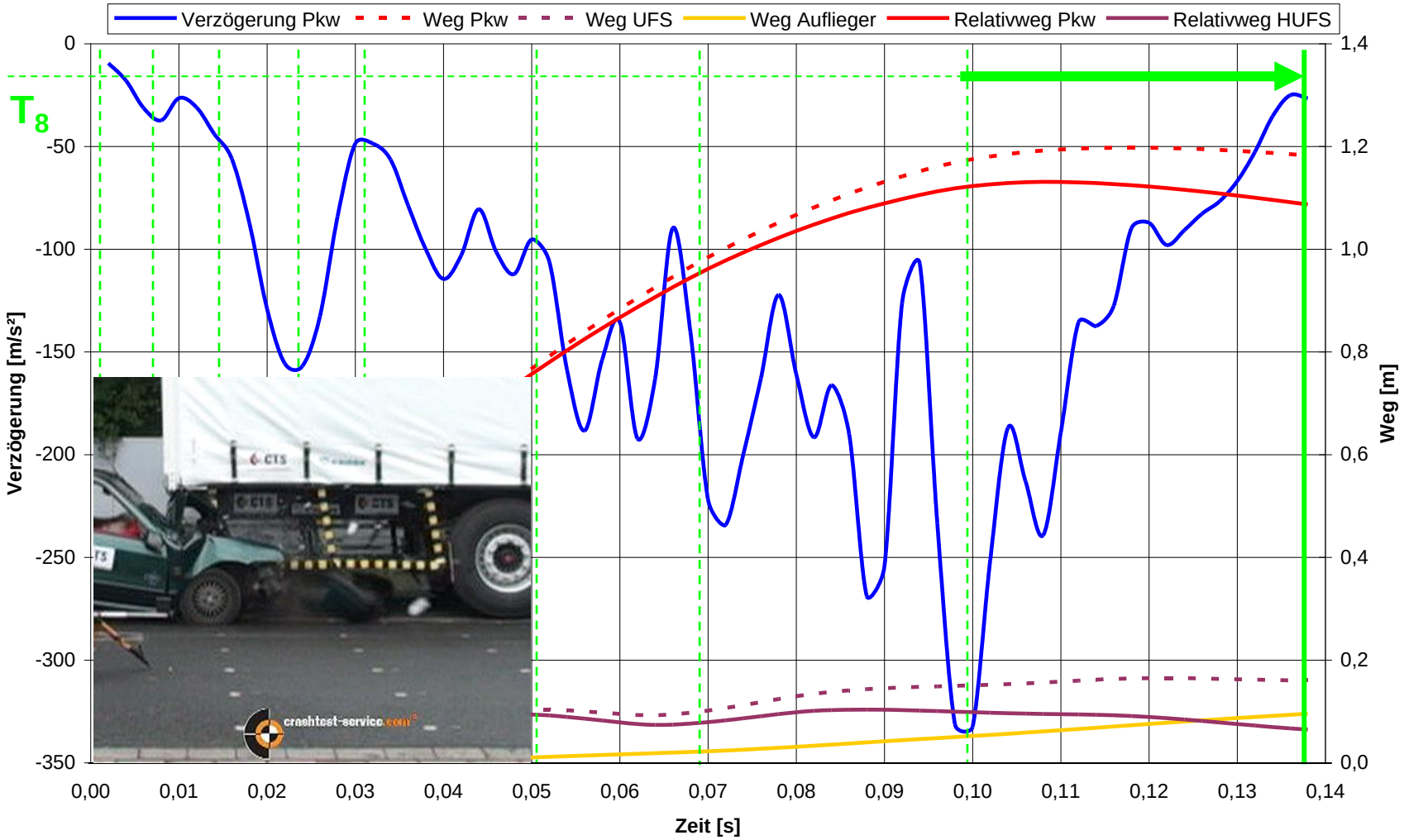
More deceleration



Maximum deceleration



Releasing of the vehicles



Schoch pallet box crashtest

Retrofit Schoch pallet box