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Enhanced Design of Modular Seating for Rail Passenger Safety and Comfort

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Object of Concept

To achieve “Freedom from Pain and Safety at Seat”, this presentation is aiming at :

Comfort

- Proper shaping of seat base at thigh portion
- Air / Cushion at lower back rest
- Vertically adjustable back rest with cushion support for head and neck
- Independent hand rest at middle portion of two/ three seater modules that has vertical / horizontal adjustment
- Adjustable foot rest

Safety

- Sturdy and relaxed seat belt
- Adjustable simple half round case with Cushion for head protection

Optional

- Built-in ear phones fixed to the head rest

Scope Definition

- Comfort at Seat:

  A state of quiet enjoyment; freedom from pain, want, or anxiety; also, whatever contributes to such a condition.

  Though efforts are made to improve comfort and safety to passenger, continual effort needs to be put-in in order to improve comfort level to Rail passengers

- Safety at Seat:

  Promising Safety to Rail passengers

  Mitigating risks in the event of disasters/ sudden jerks, simple half round head case fixed to head rest and safety belt are to be discussed/ implemented

Challenges

- Retain Seating capacity as it is
- Free from Maintenance
- Easy to retrofit
- Low Cost
- Limiting the number of parts
- Long life
- Interchangeability
- Adherence to International standards

Constraints

- Limited space
- Limited Size
- Fire Proof
- Reduced Weight
- Limited flexibility for vertical adjustments
- High Reliability
- Low Maintenance

Freedom from Pain

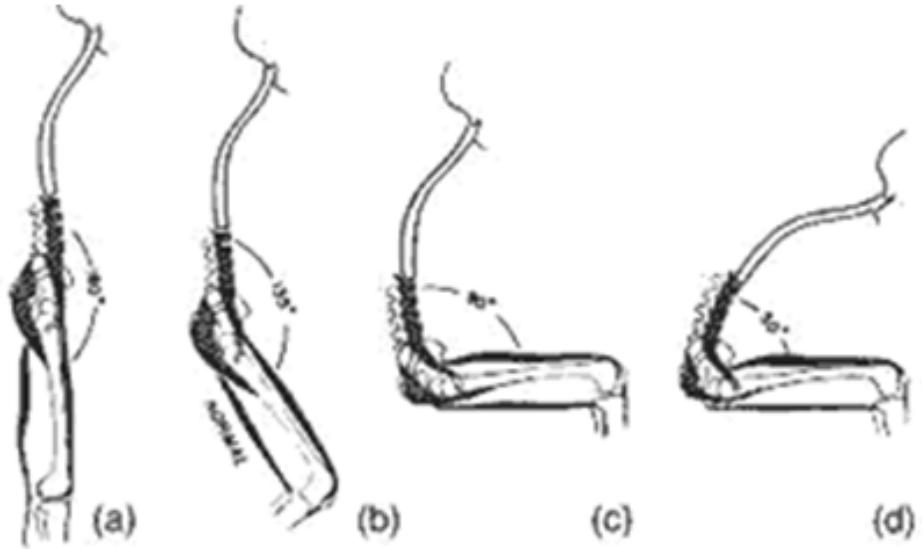
- Sciatica is different to general back pain; the pain of sciatica hardly affects the back at all but radiates out from the lower back, down the buttocks and into one or both of the legs, right down to the calf.

  Long travel while in seat increases negative effects. Dividing back rest into 2 pieces will mitigate this effect and provide freedom of movement and will enhance the level of comfort.

- Edema is the medical term for swelling caused by a collection of fluid in the small spaces that surround the body tissues and organs. Edema can occur nearly anywhere in the body.

  Perfect shaping of seat base at thigh portion in balanced position and adjustable support at foot will help to reduce the effect.

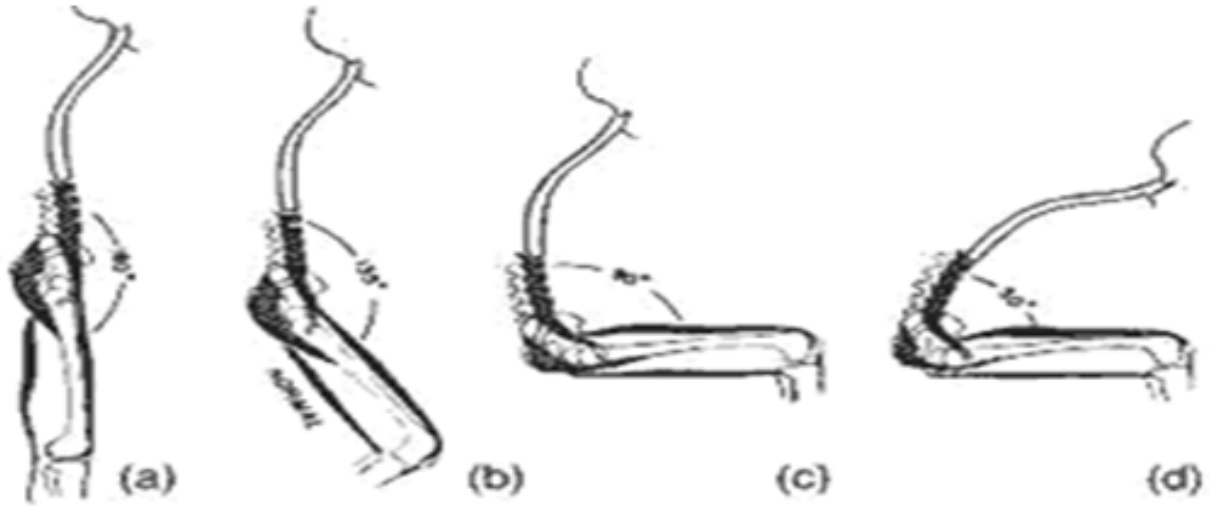
Necessity for change



Positions of seating

Balanced Seating without back support for long run travels

Necessity for change



- Position B indicates distributed load of the body at Lumbar section, Knee section and foot rest.
- Best suitable for long hours sitting

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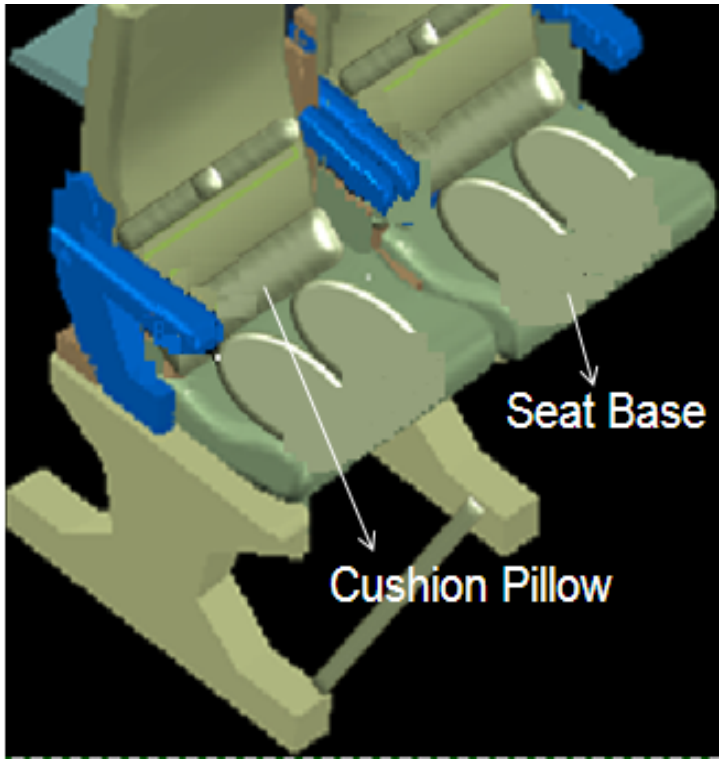

Seat base

- Curved seat base to experience natural resting at thigh portion
- Dividing base into two rest points
- Air/ Cushion pillow support at lumbar portion
- Use of two part moulded base one with hard plastics and other with flexible plastic
- Assembly of these two parts are as simple as snap fits or press fit

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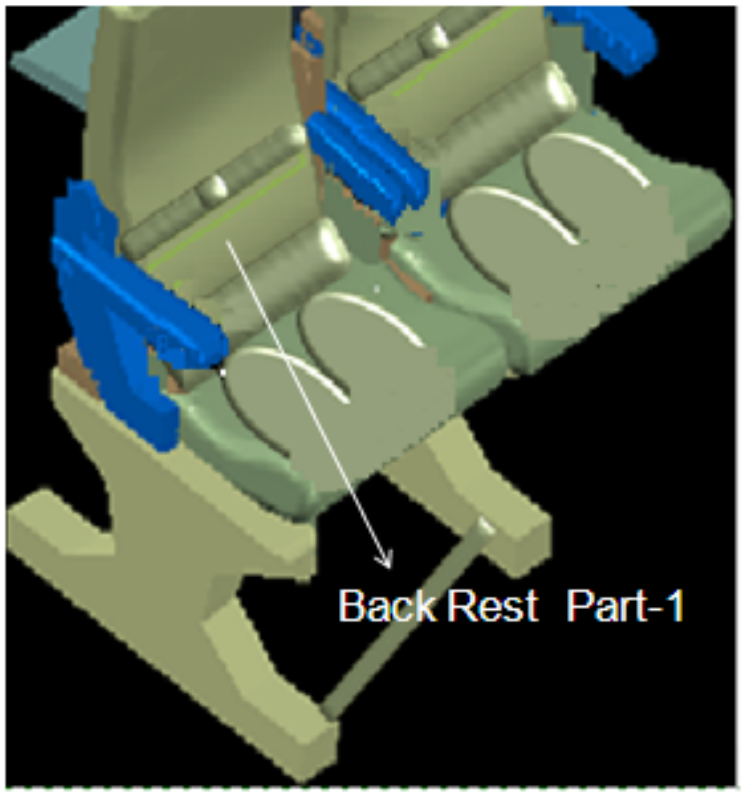

Back Rest – Part 1

- Part 1 back rest supports and secures the human body up to lumbar section and relieves from pain
- This design leads to achieve more than 120° angle at lumbar section that approaches to natural resting position
- This arrangement allows the spine to carry the body weight easily and allows muscles to relax.
- This part is fixed to the seat base.

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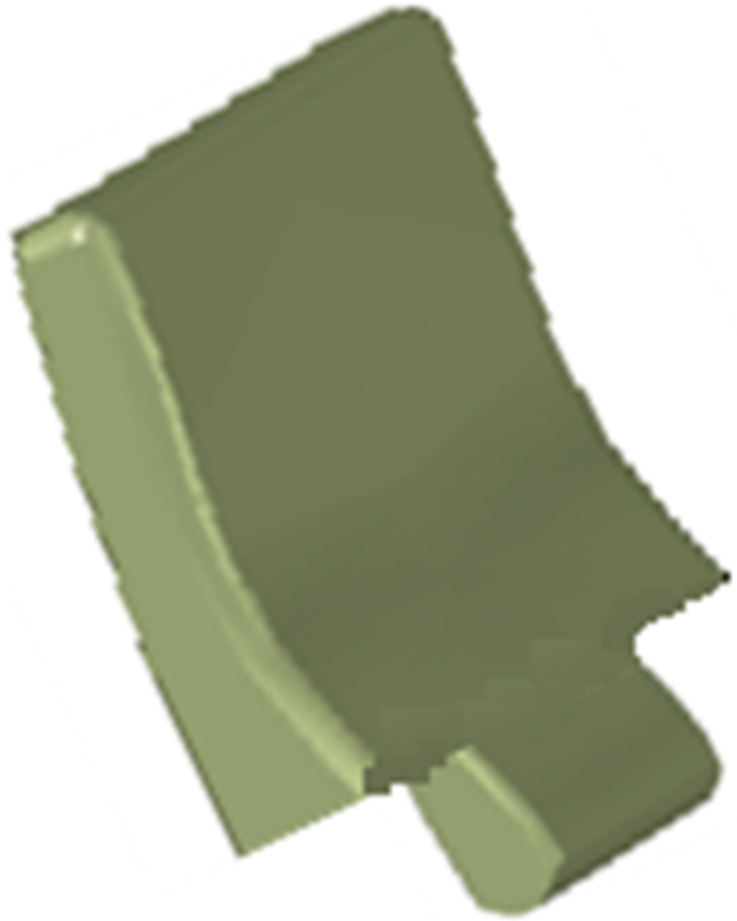

Back rest – Part 2

- Part 2 back rest supports and secures the human body above lumbar section and relieves from pain
- This portion of the back rest has flexibility to move backwards with adjustment knob.
- This movement is sufficient to achieve more than 120° at Lumbar section
- Adjustment of this support can be achieved using two plate springs fixed in the backside
- Assembly of these parts are as simple as snap fits or press fit

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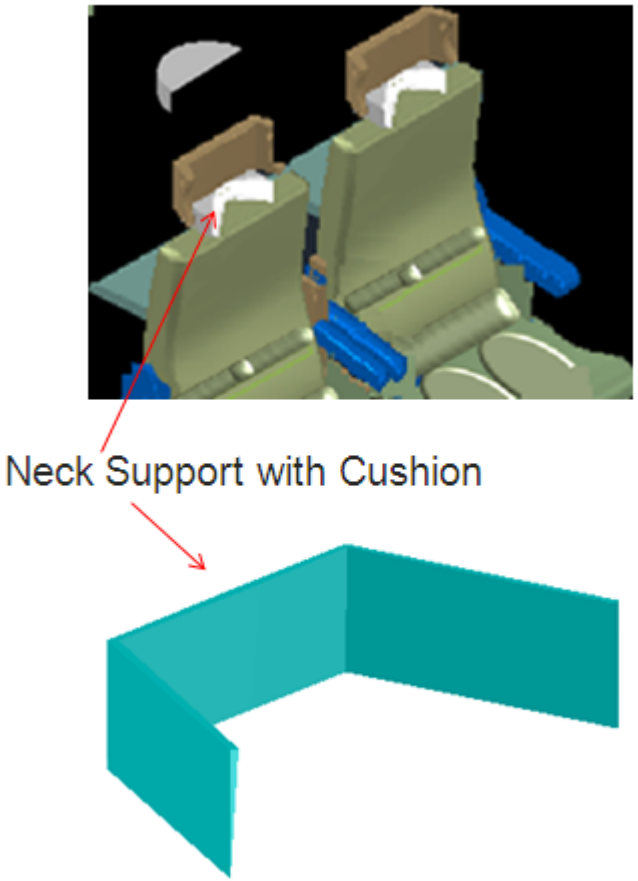

Neck Support

- Neck support with adjustable cushion pads
- Vertical adjustment along with head rest to suit individual heights
- Just a support and flexibility to move
- Useful for long distance travels
- Greater relaxation

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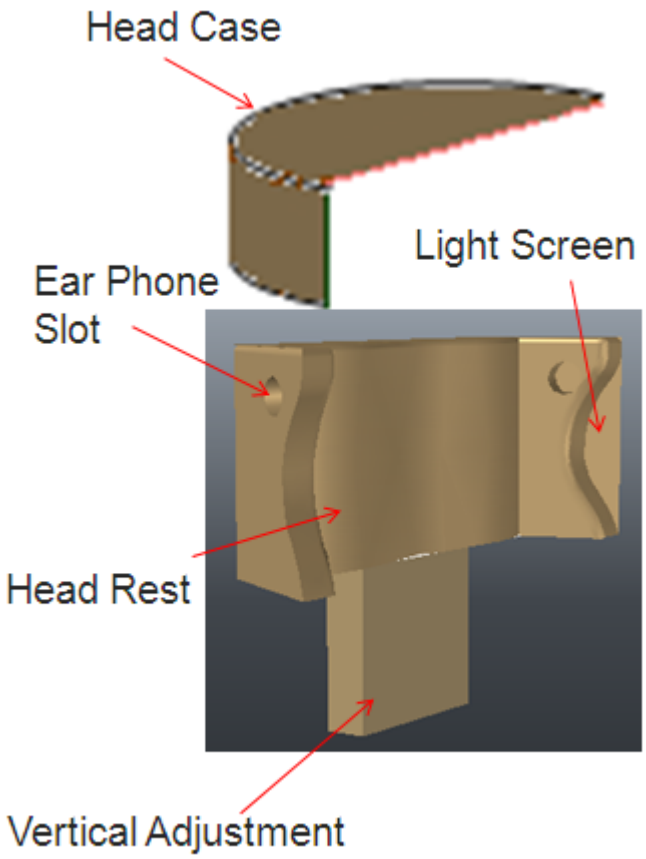

Head rest

- Head support with cushion pads
- Vertical adjustment to suit individual heights
- Cushion pads cover up to ears
- Light screen arrangement which is extension to the cushion pads
- Simple half round head case fixed to the head rest in order to provide protection to passenger head
- Built-in Ear phones in the head rest

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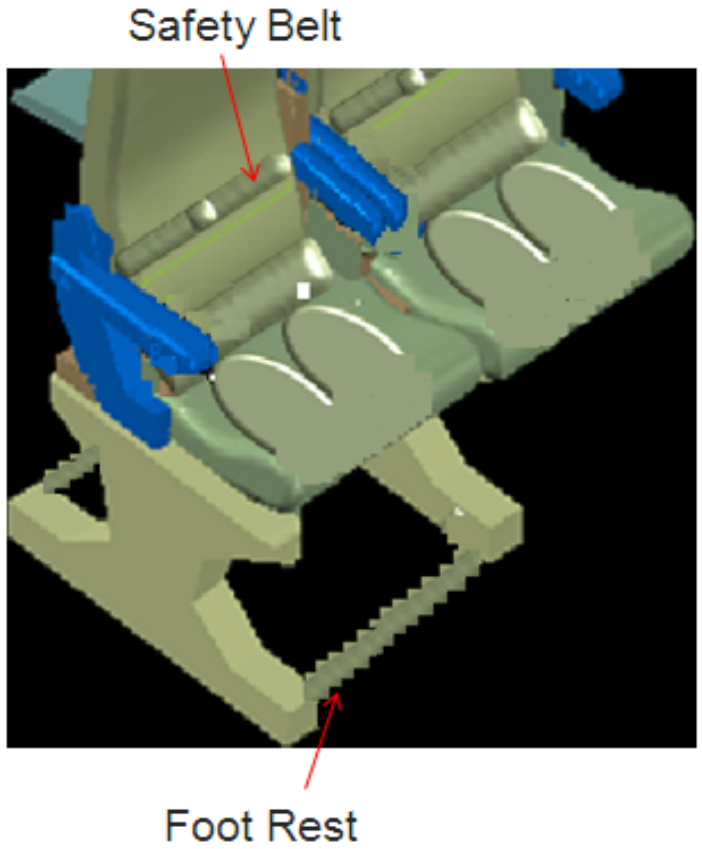

Safety Belt

- Seat belt is provided in the bottom portion of the back rest part 2.
- Robust and flexible seat belt facilitates comfort to passenger

Foot rest

- Foot rest is mounted in the bottom portion on front and back sides of each seat
- Curved movement of the foot rest enables easy adjustment to suit individual heights
- This enables uniform transfer of body weight to the foot and then, to the foot rest

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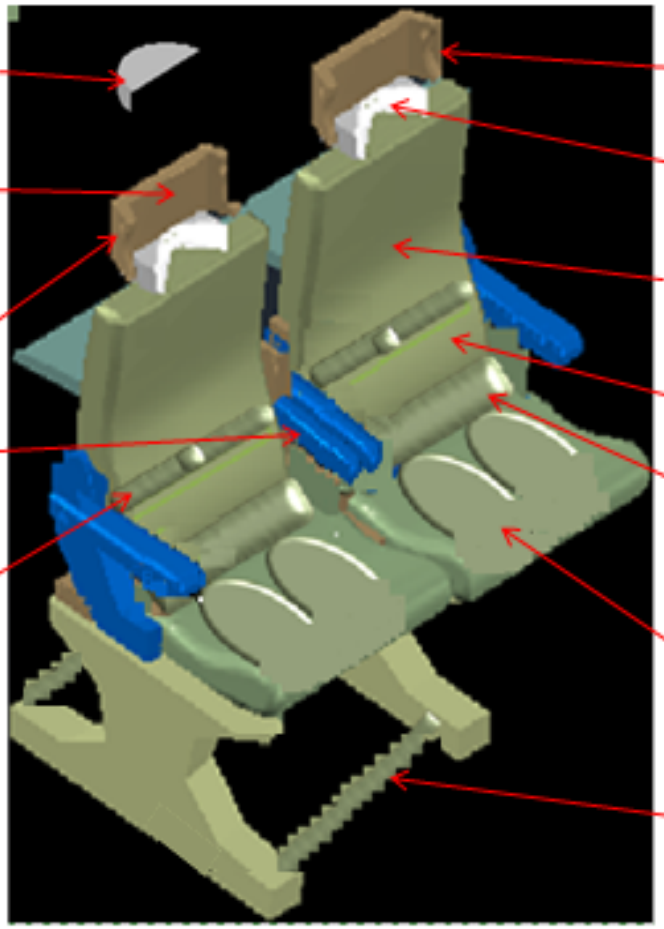

Conclusion

“Freedom from Pain and Safety at Seat” can be achieved by adopting below recommendations as part of **“Enhanced Design of Modular Seating”** for Rail Passenger Safety and Comfort:

- Proper shaping of seat base at thigh portion
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