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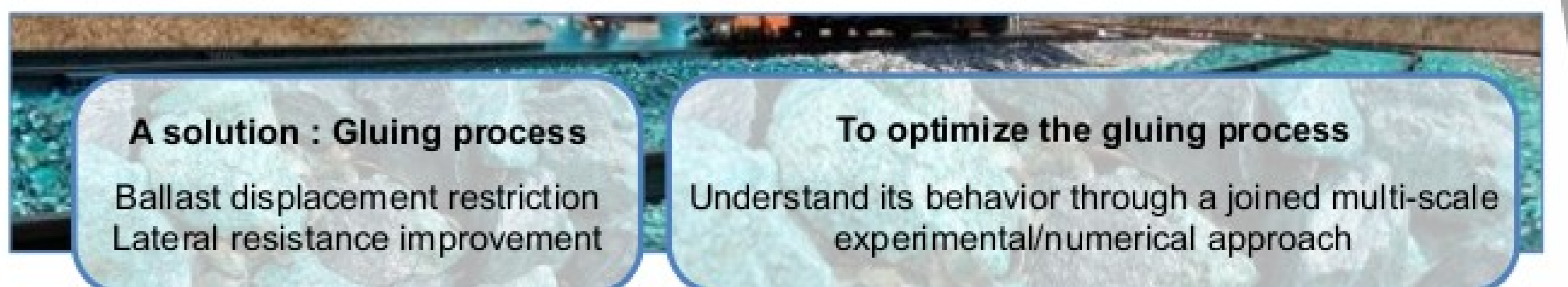
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# Toward the optimization of the ballast gluing process for track resistance lateral enhancement

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### Microscopic scale (grain)

- Characterization of glued contact in traction
- Grain surfaces conserved
- Controlled contact typology (point/face, edge/face and face/face contacts)
- Minimum of 15 repetitions

**Main conclusions :**

- Tensile strength depends on adhesive surface contact
- Contact topology influences tensile strength
- Displacement at maximum tensile strength independant of glued surface

**Interaction law A Maugis-Dugdale model**

$\gamma$  cohesive force  
 $g$  contact gap  
 $r_n$  normal contact force

$g \geq 0, \quad r_n + \gamma = 0$   
 $g \cdot (r_n + \gamma) = 0$

$F$   
 $F_{cohesion}$   
 $g_{cohesion}$   
 $g$

### Mesoscopic scale (REV)

Glue repartition ? Glue bound volume ?

**Gluing experiment :**

- Box dimension : 40x60x60 cm
- Ballast density : 1543 kg.m<sup>-3</sup>
- Glue quantity : 1,25 L.m<sup>-2</sup>

**Main conclusions :**

- Number of glued grains decrease with depth
- Volume of glued contact independant of its position

### Macroscopic scale (Railway section)

#### lateral resistance tests

Experimental Part      Numerical Part

**Gluing Configurations**

**Main conclusions :**

- Numerical model requires ajustements
- Similar tendencies