

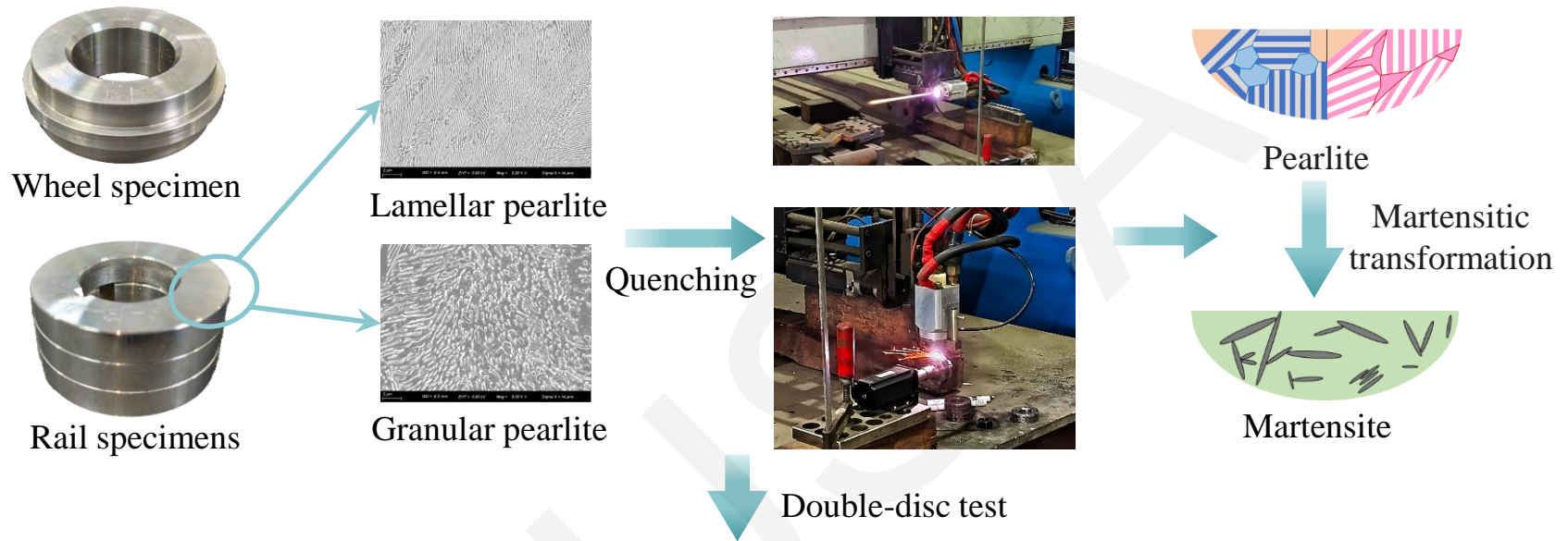
# Effect of laminar plasma quenching technology on the anti-wear and anti-fatigue properties of two types of U75V rail welded joints

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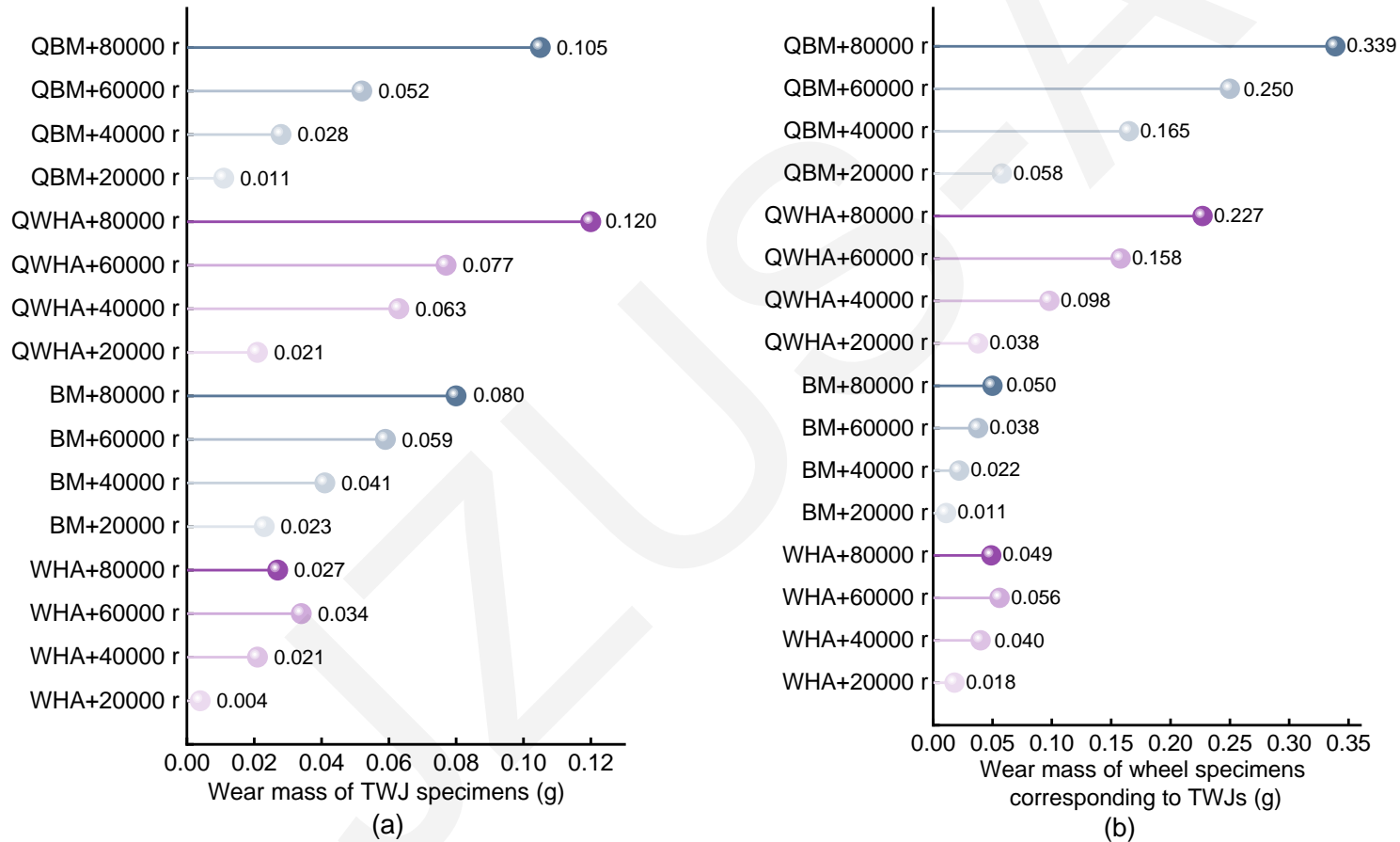
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# Laminar plasma quenching technology



# Conclusions

- LPQ can significantly enhance the wear resistance of FWJs



**Fig. 1 Wear mass of joint and wheel specimens before and after LPQ treatment**

# Conclusions

- LPQ can suppress the formation of cracks in welded joints.

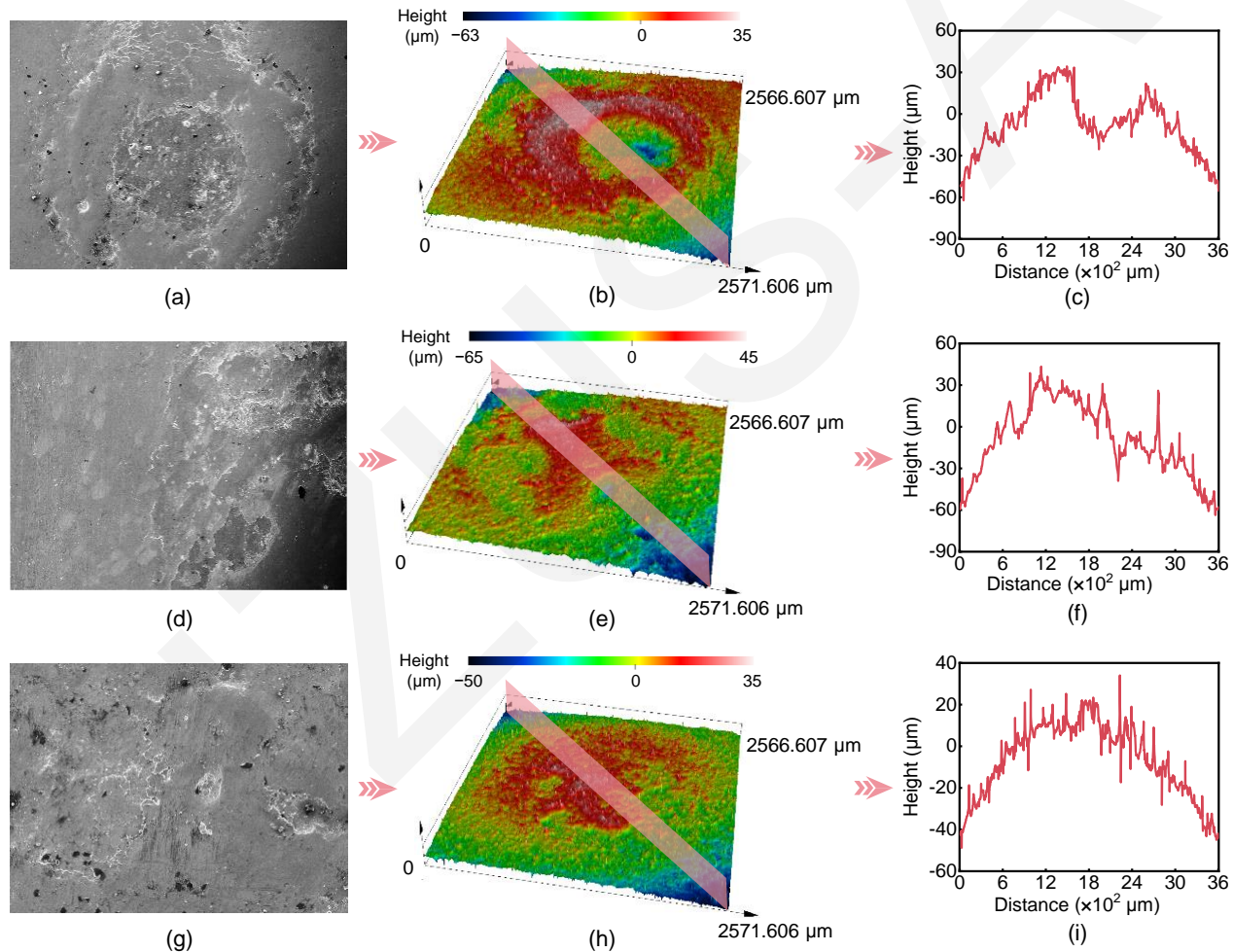
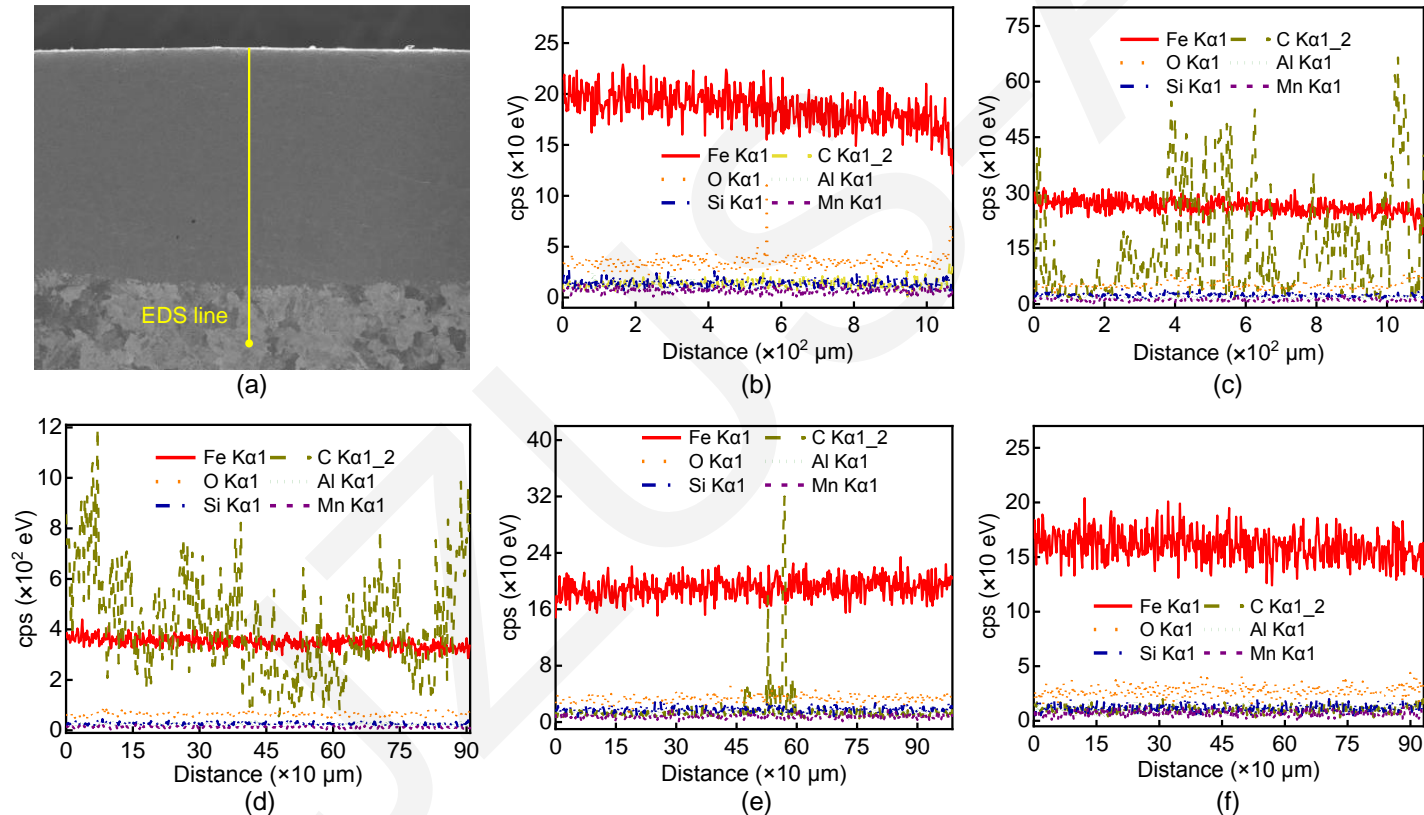


Fig. 2 Morphological analysis of surface damage on the QTJ specimens

# Conclusions

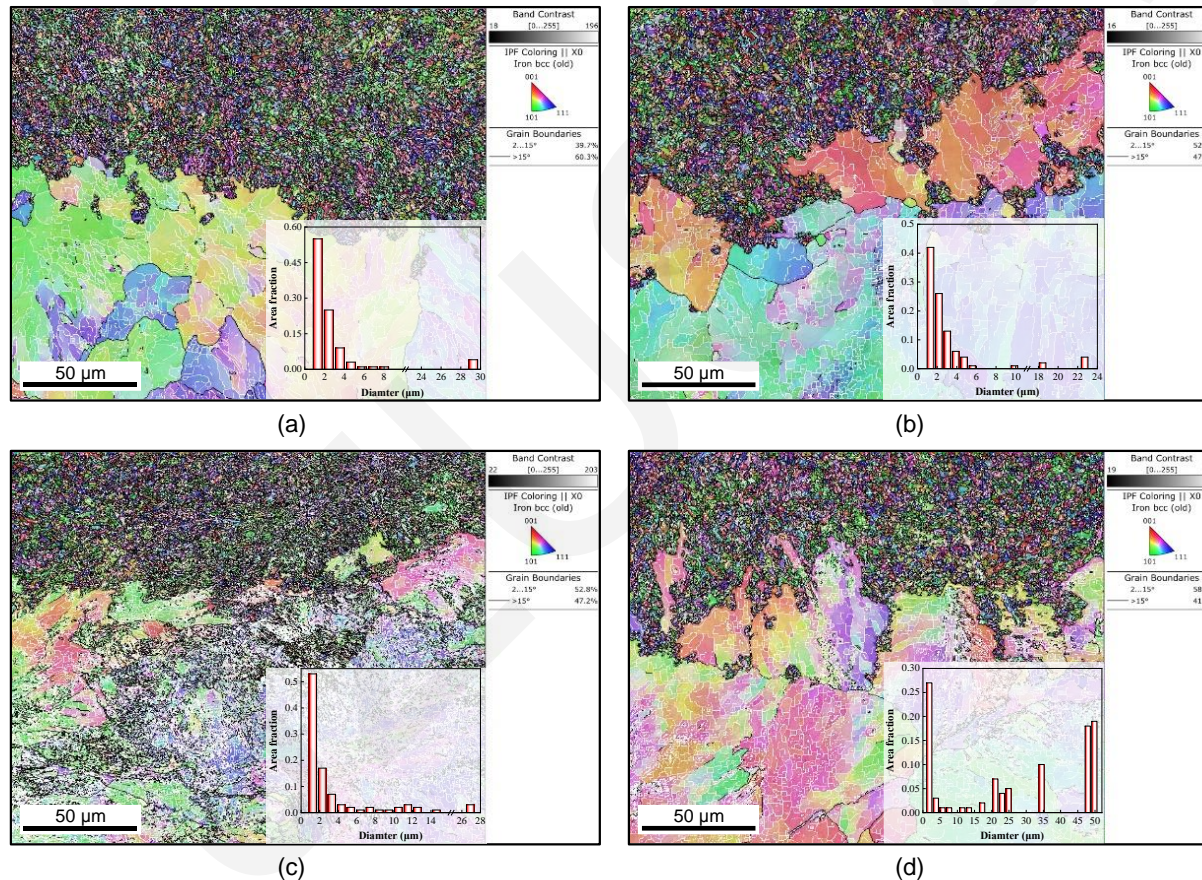
- Significant oxidative corrosion occurs within the cracks of the transition zone in QFJ.



**Fig. 3 EDS line scans of two types of quenched welded joints perpendicular to the transition zone: (a) EDS line scan of the physical image; (b) TWB; (c) THA; (d) FWB; (e) FHA; (f) BM.**

# Conclusions

- The proportions of HAGBs presents an overall distribution law of “HA>WB” and “QFJs>QTJs”.



**Fig. 4 IPF maps of QTJs and QFJs in different zones: (a) TWB; (b) THA; (c) FWB; (d) FHA**

# Insights



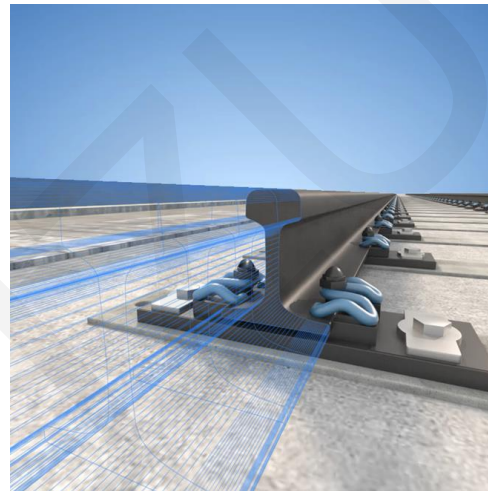
**Outdoor environments >> laboratories**



Thermal load



Train load



**Complex load conditions and rail vibration**

**Further work should be conducted on a full-size test bench or in field tests, considering the coupling effect of environmental and train loads.**