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Intelligent Automation Centre

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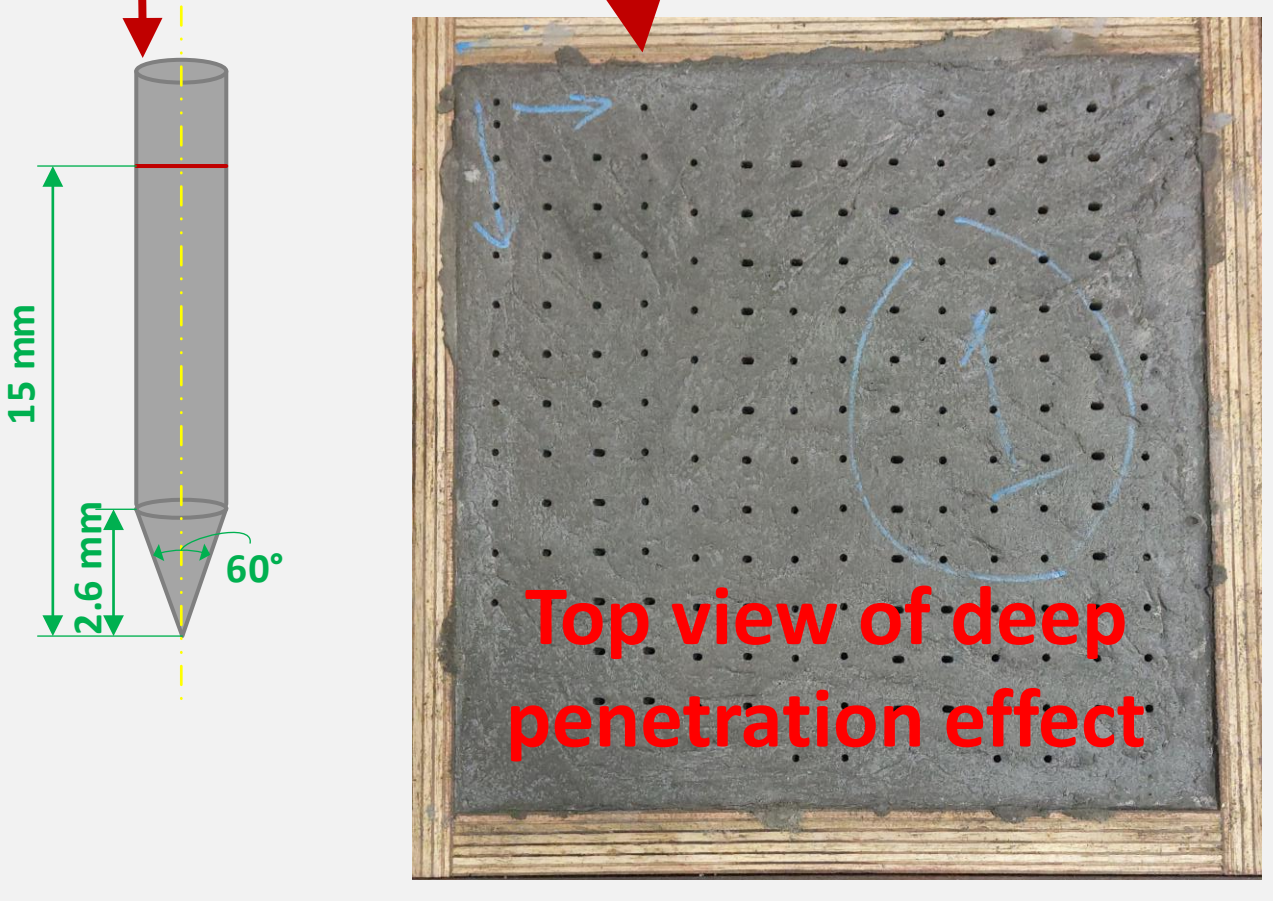
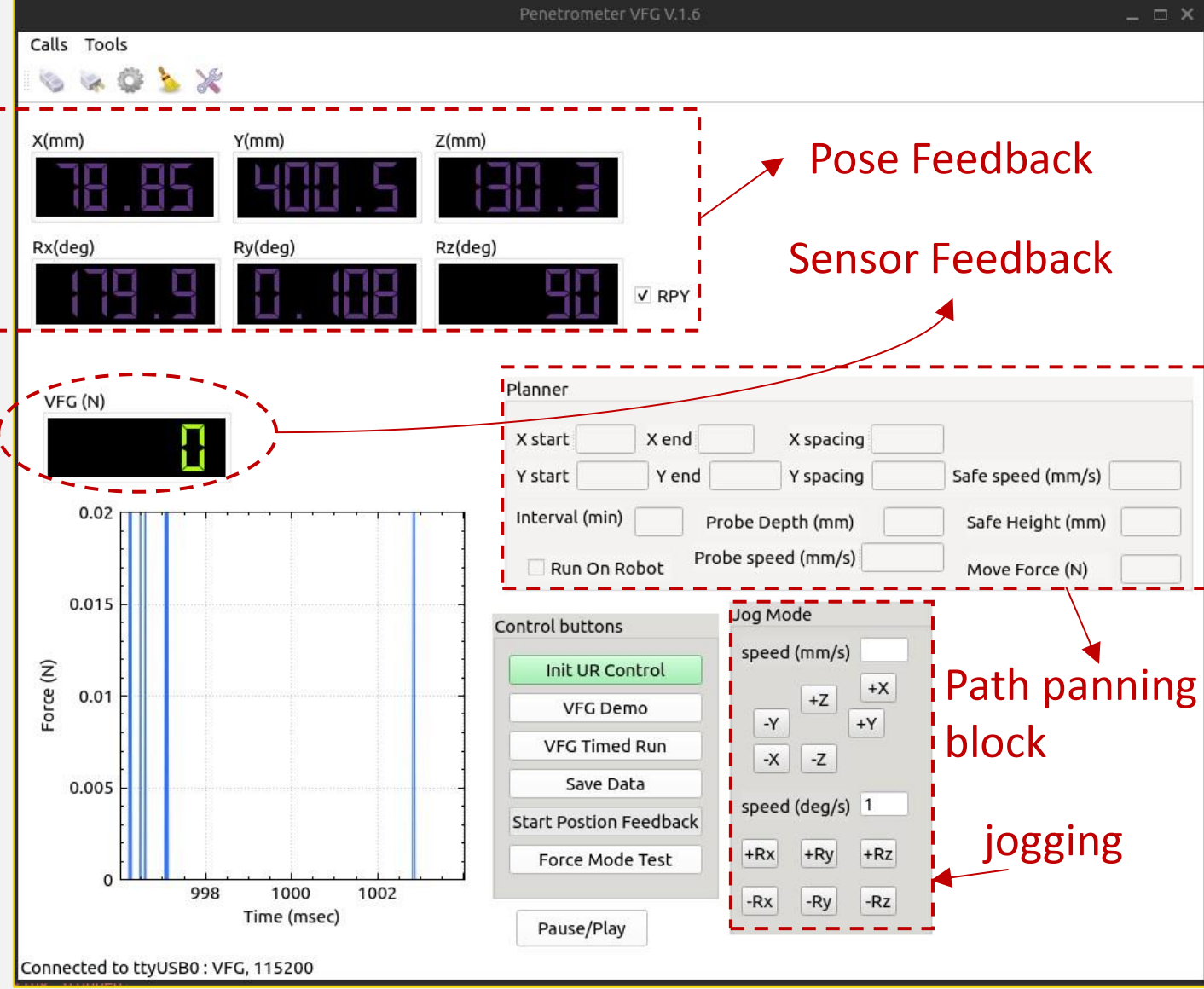
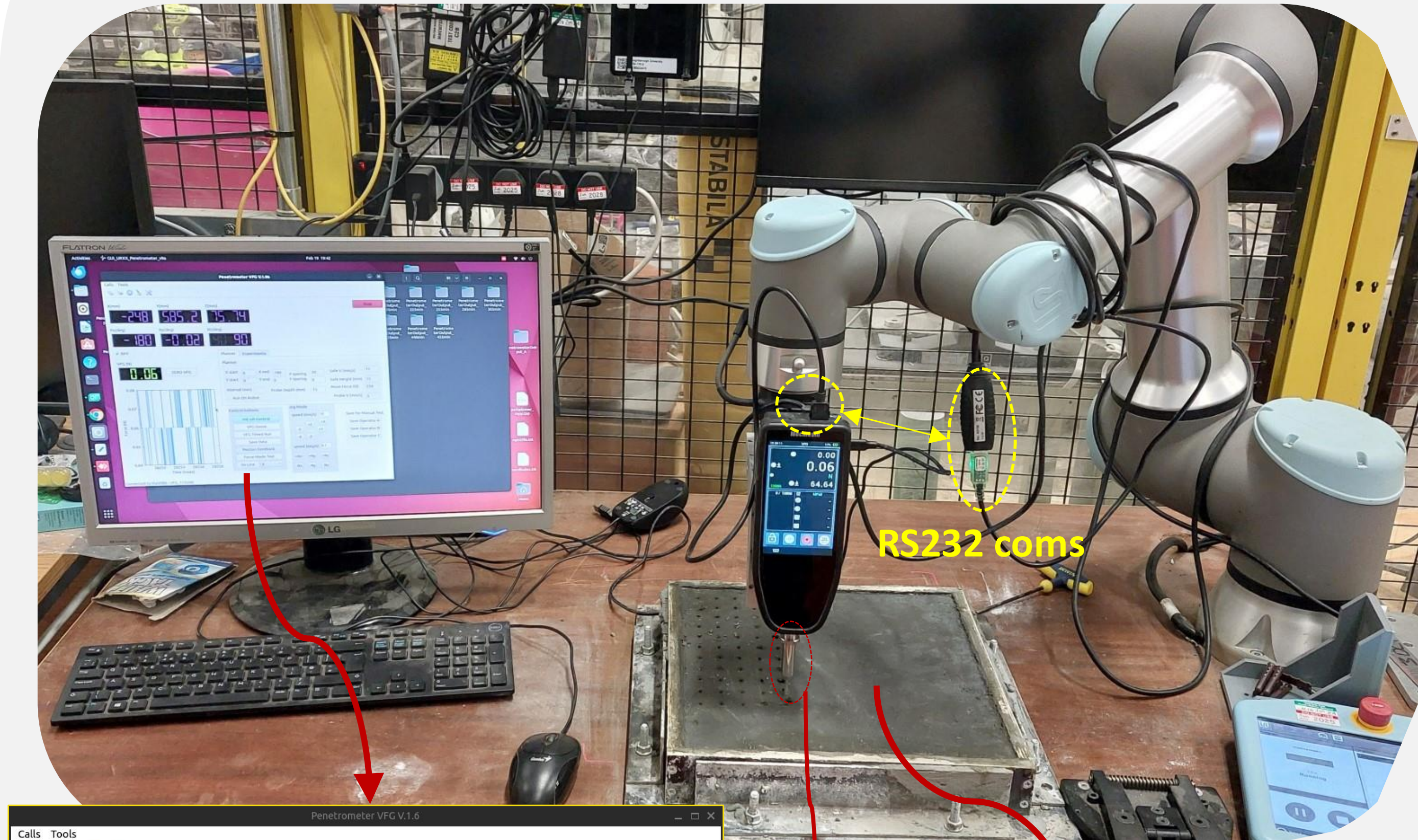
Demo Videos



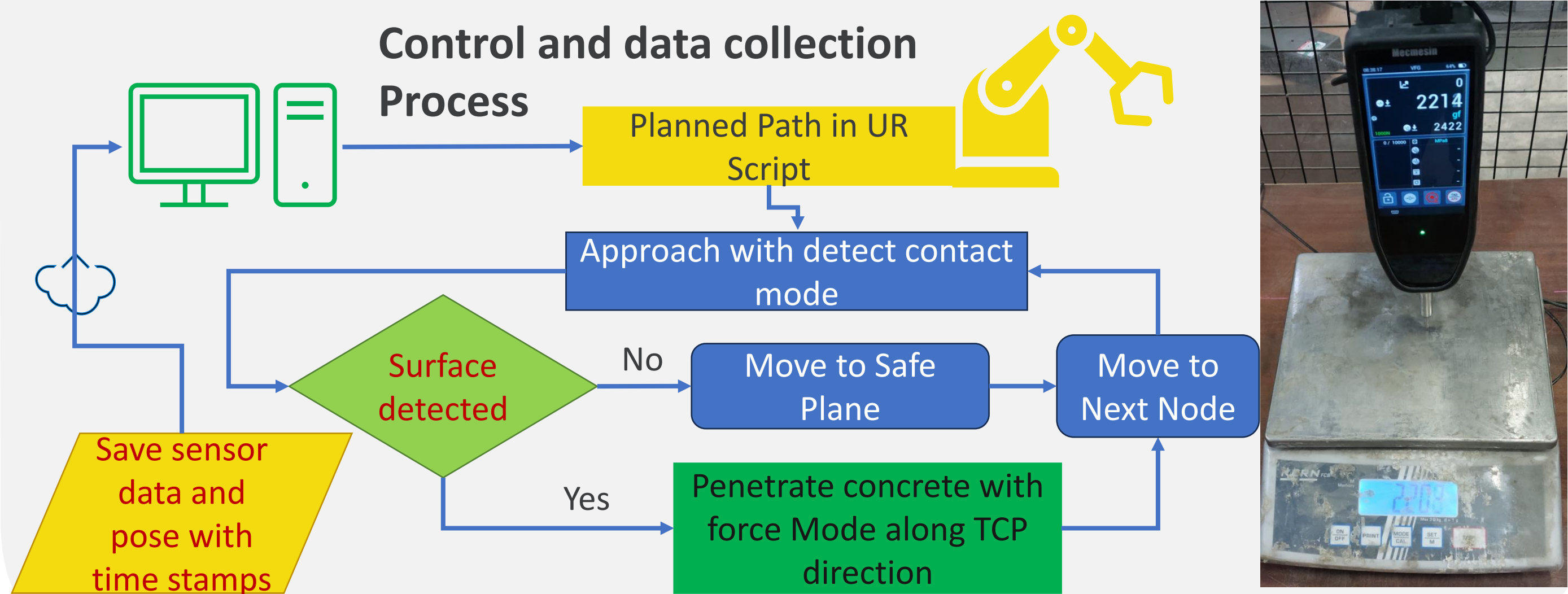
Authors: Sina Akhbari, Peter Kinnell, Liam Whyte, Andy Gleadall, Sergio Cavalaro, Richard Buswell

Overview: Concrete digital manufacturing requires reliable monitoring of fresh material properties, but current practice relies on manual tests. We present two automated approaches: (i) a vision-based slug test, where droplet geometry and mass reveal yield stress and print open time; and (ii) a robotic penetrometer, providing repeatable, minimally invasive strength measurements during setting. Together, they enable adaptive, measurement-driven control of 3D printed concrete.

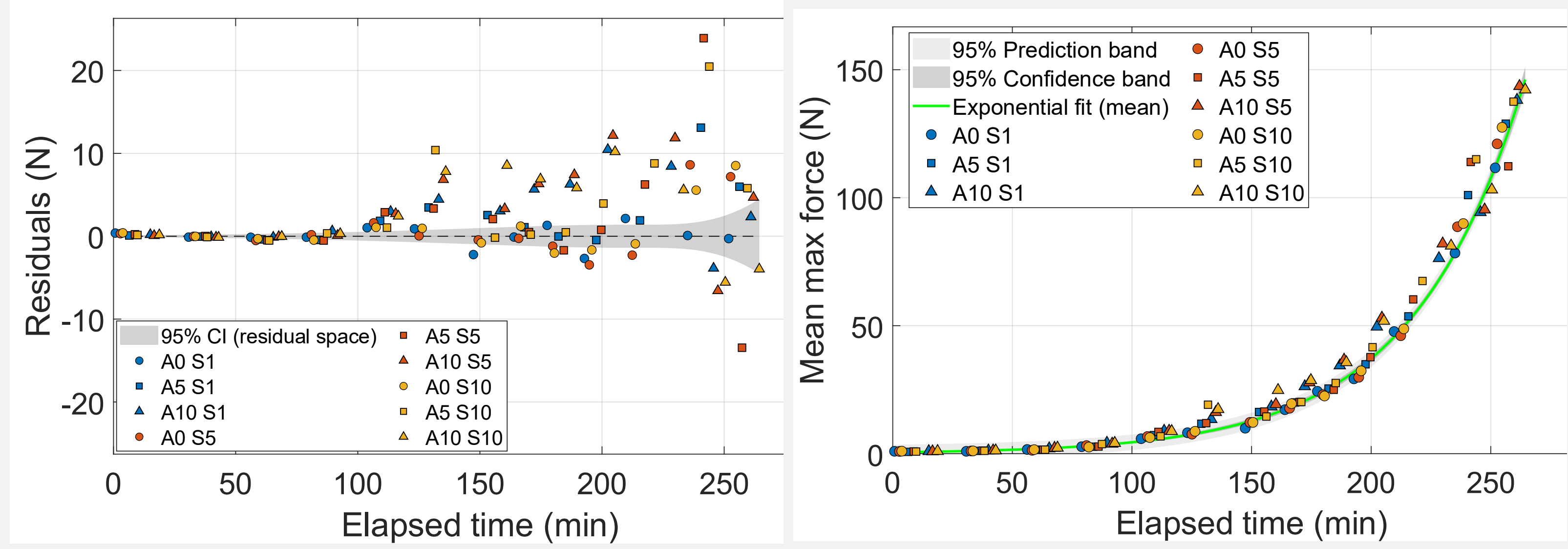
Process Simulation and Experimental Setup



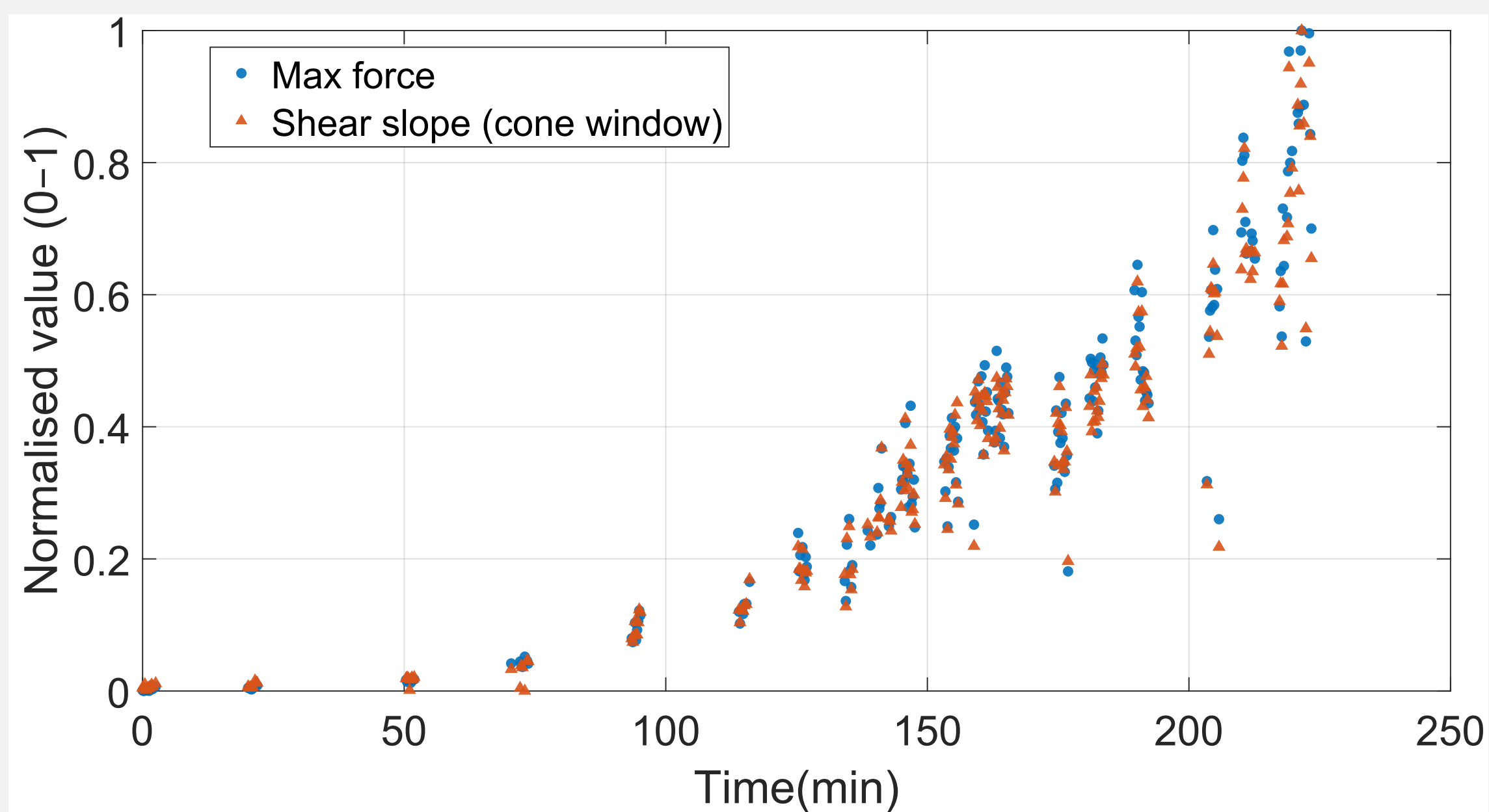
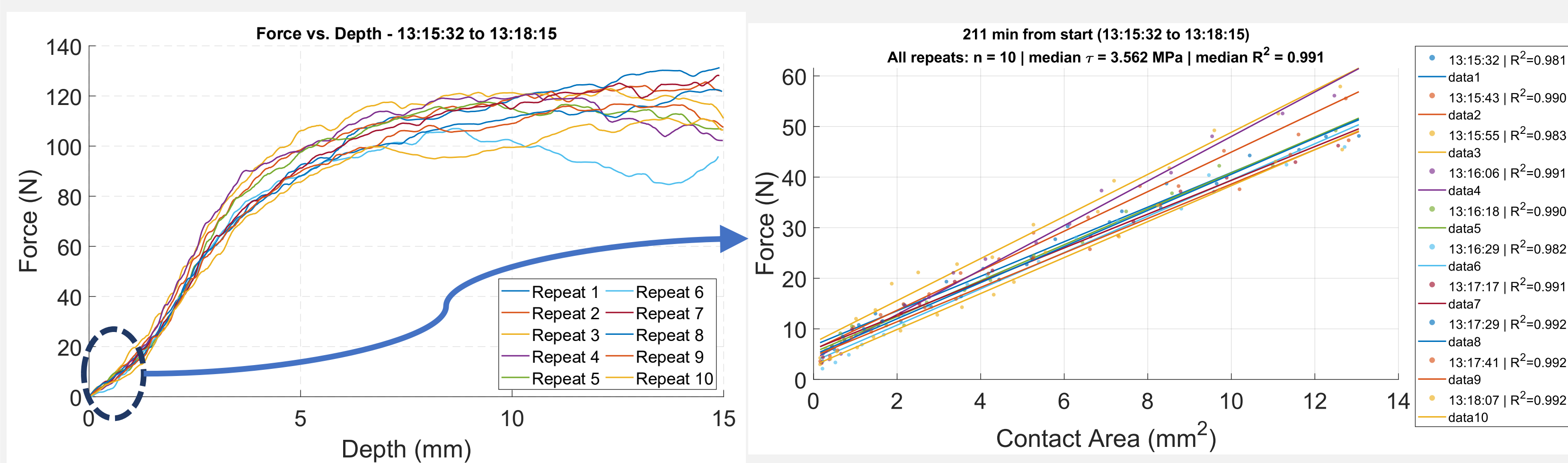
Calibrated Penetrometer



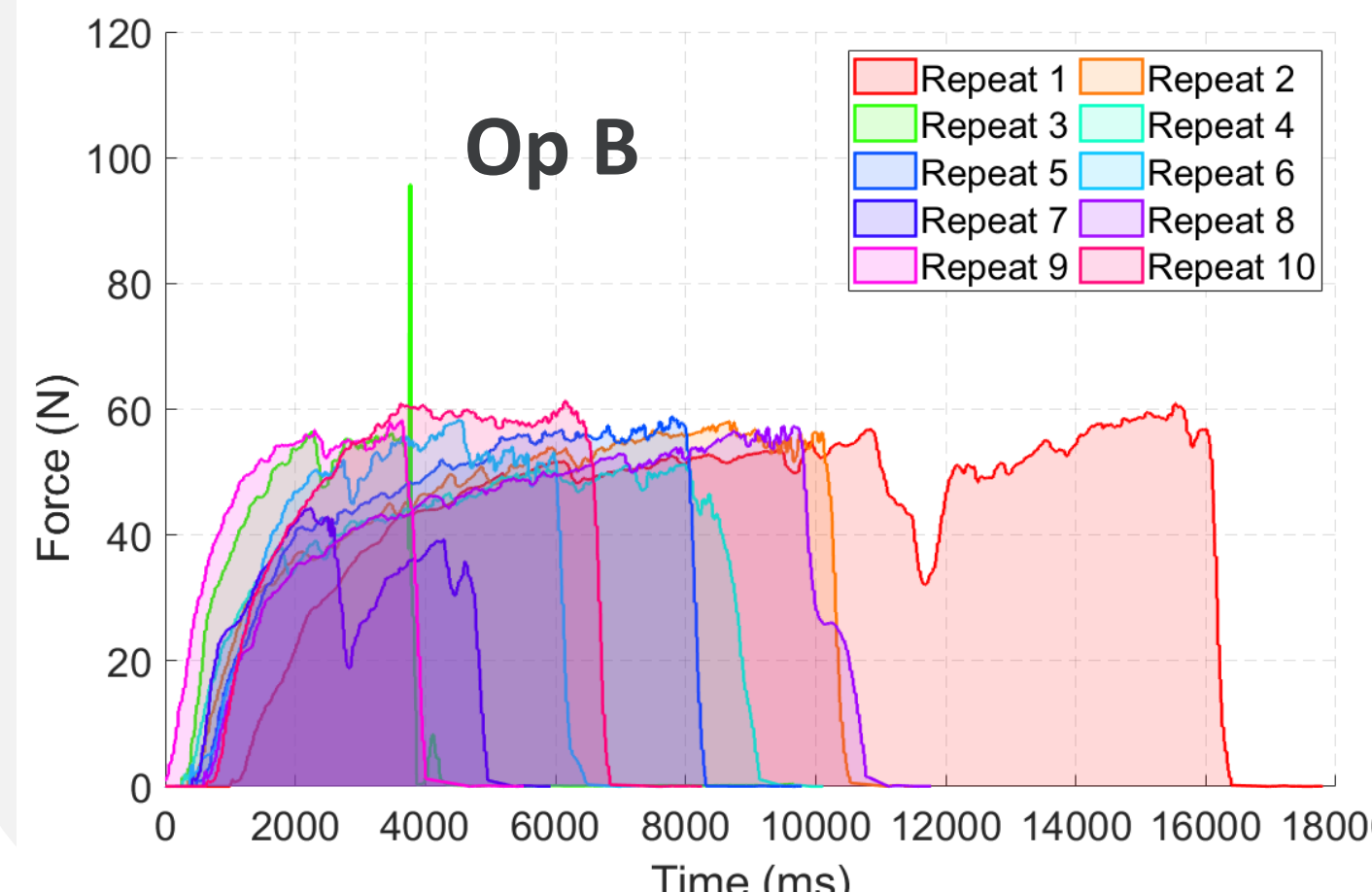
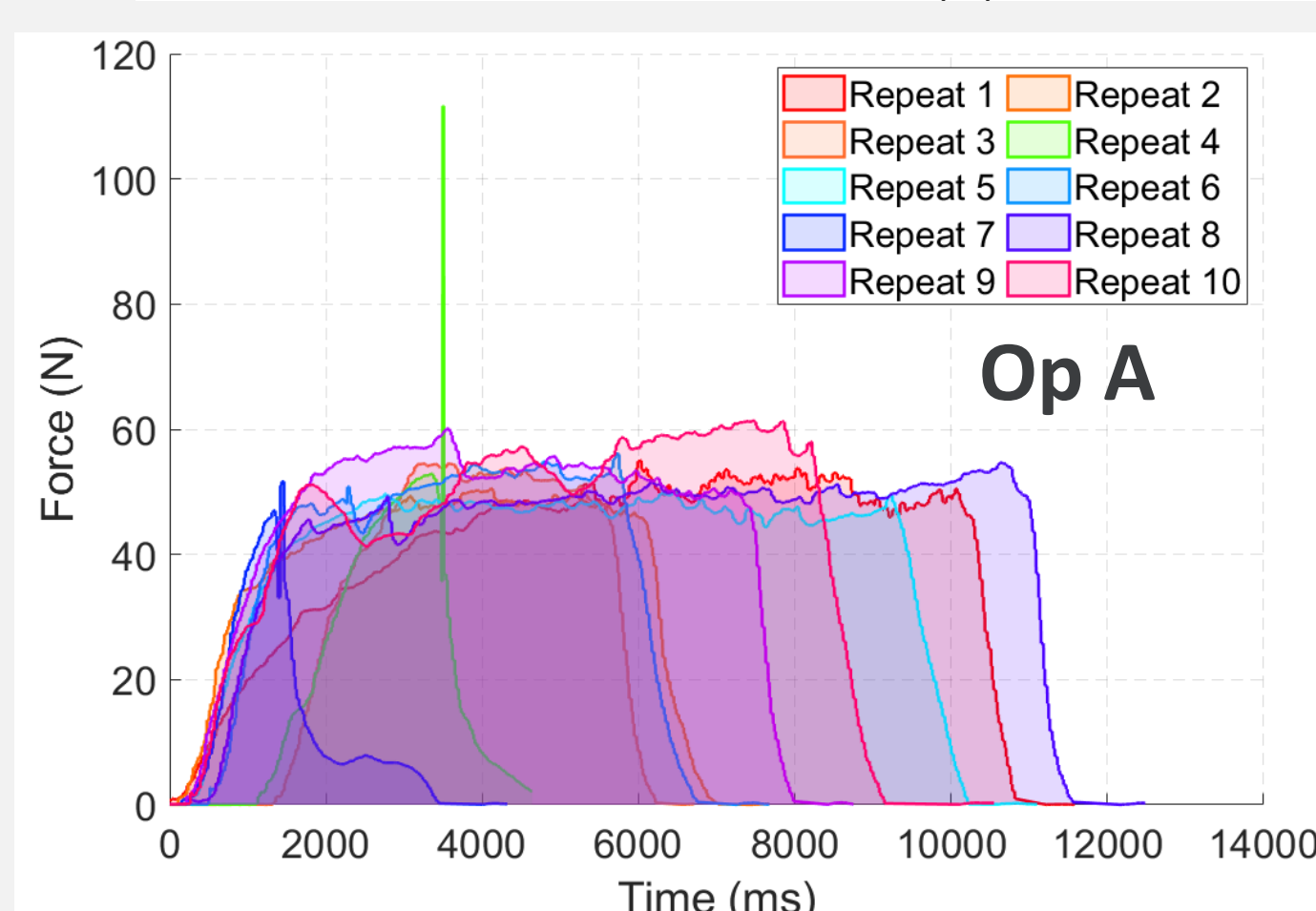
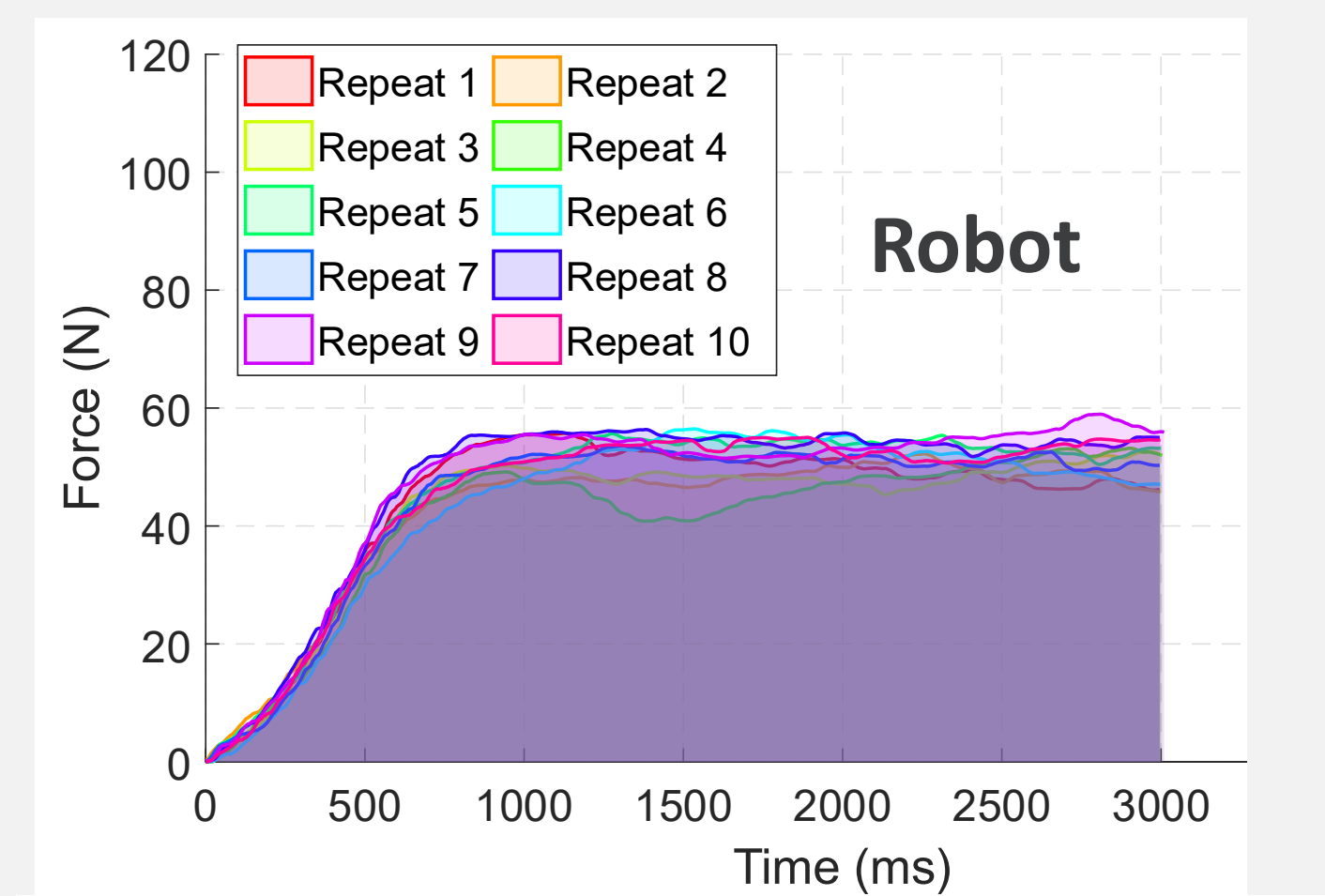
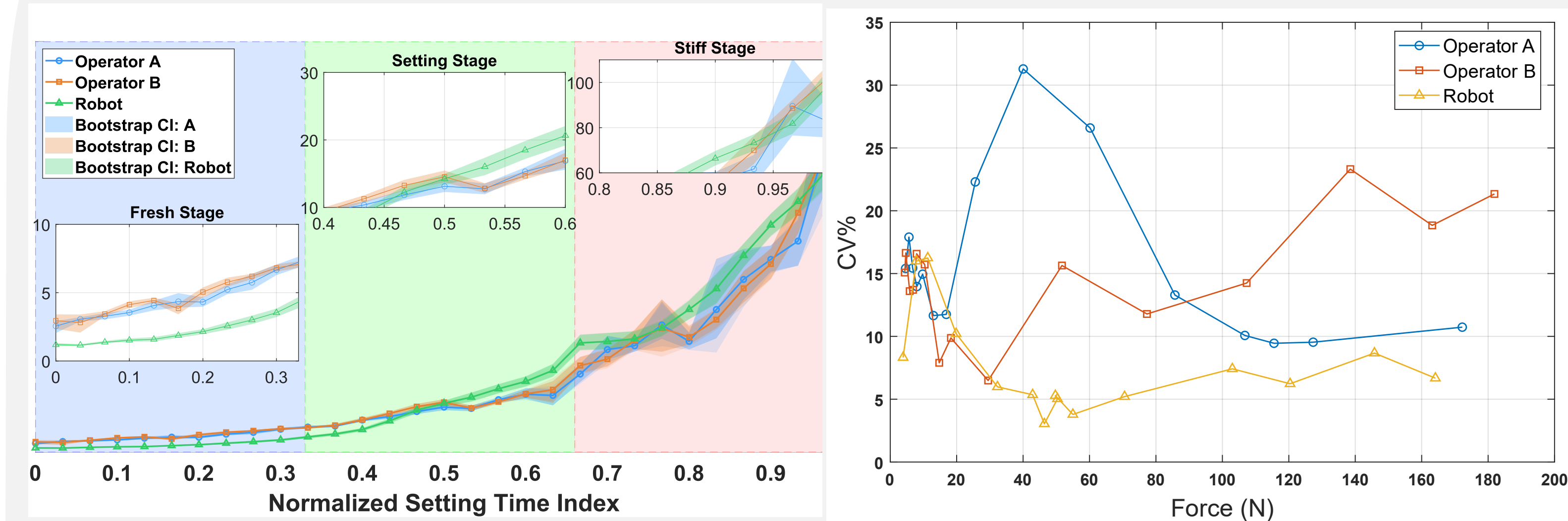
Penetrometer Results Effects of Seed (S) & angle (A)



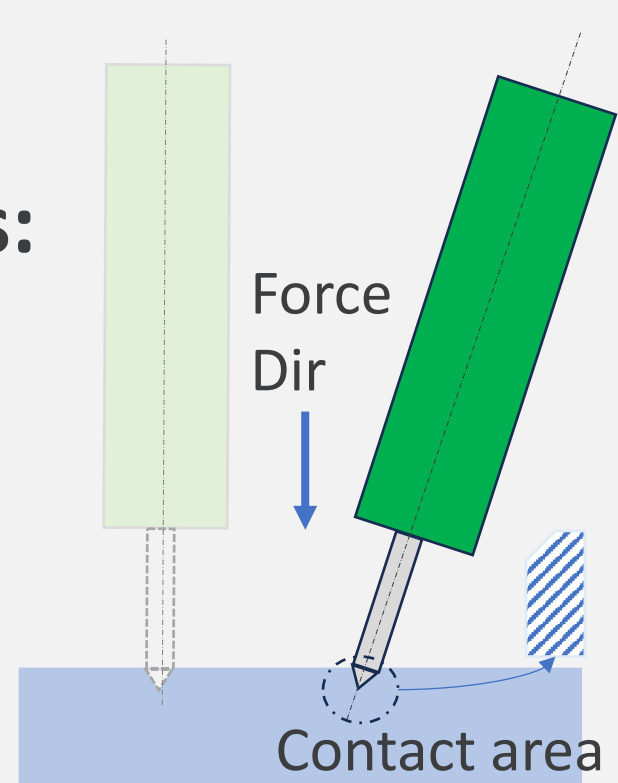
Slope vs max force as setting index



Penetrometer Results Robot vs Human



Variation potential causes:
speed
Angle
No force control



Slugs Test and results

