Proposal for amendments to UN Regulation No. 140 Electronic Stability Control (ESC) Systems

I.   Proposal

Paragraph 9.9.4., amend to read:

"9.9.4.   The steering amplitude of the final run in each series is the greater of 6.5 A or 270 degrees, provided the calculated magnitude of 6.5 A is less than or equal to 300 degrees. If any 0.5 A increment, up to 6.5 A, is greater than 300 degrees, the steering amplitude of the final run shall be 300 degrees.
If the above calculated steering amplitude of the final run is greater than the maximum operable steering wheel angle determined by design of the steering system, the final angle amplitude for the series test shall be greater than 98 per cent of the maximum operable angle.

In case that saturation of the front tyres happens before the above calculated magnitude angle, this angle may be used as the final steering amplitude, but only if this angle is greater or equal to 6.5 A."

II.   Justification

1.   Reaching fixed amplitude, i.e., fixed steering wheel angular speed due to given 0.7 Hz sine frequency, needs much more torque with quick steering gear ratio systems than with slow steering gear ratio systems, and produces much more wheel steer.
2.   Car behavior (yaw rate, lateral acceleration and thus trajectory) is similar for all amplitudes above approx. 7 to 8 A (i.e., more than 7 times the steering wheel angle corresponding to 0.3 g), because front tires are saturated. More steer of the tires doesn't provide more lateral force, so yaw rate and lateral acceleration don't increase. Continuing to increase steering wheel amplitude after front tire saturation doesn't give more information.
3.   There might appear in the future some vehicles which have significantly low steering gear ratio (i.e., quick steering characteristics) and may need too much steering wheel torque to achieve the 270 degrees sine amplitude at 0.7 Hz (not reachable by conventional steering robots), then jeopardizing the easy approval of future beneficial steering equipment e.g. steering-by-wire systems.

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