Experimental Research of Sand Wash-off From Urban Surfaces

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Problems

Sediments entering the sewerage network:

- Decrease its flow capacity,
- Increase its roughness,
- Increase risks of effusion and floods.

Local sediment characteristics

- Sand and dust

Source

- Wind,
- Traffic,
- Prevention of ice forming

Objective

- Define the links between the characteristics of rain and the quantity of sand washed off from inclined concrete surfaces.

Method

- Laborathory measurements

Laborathory installation

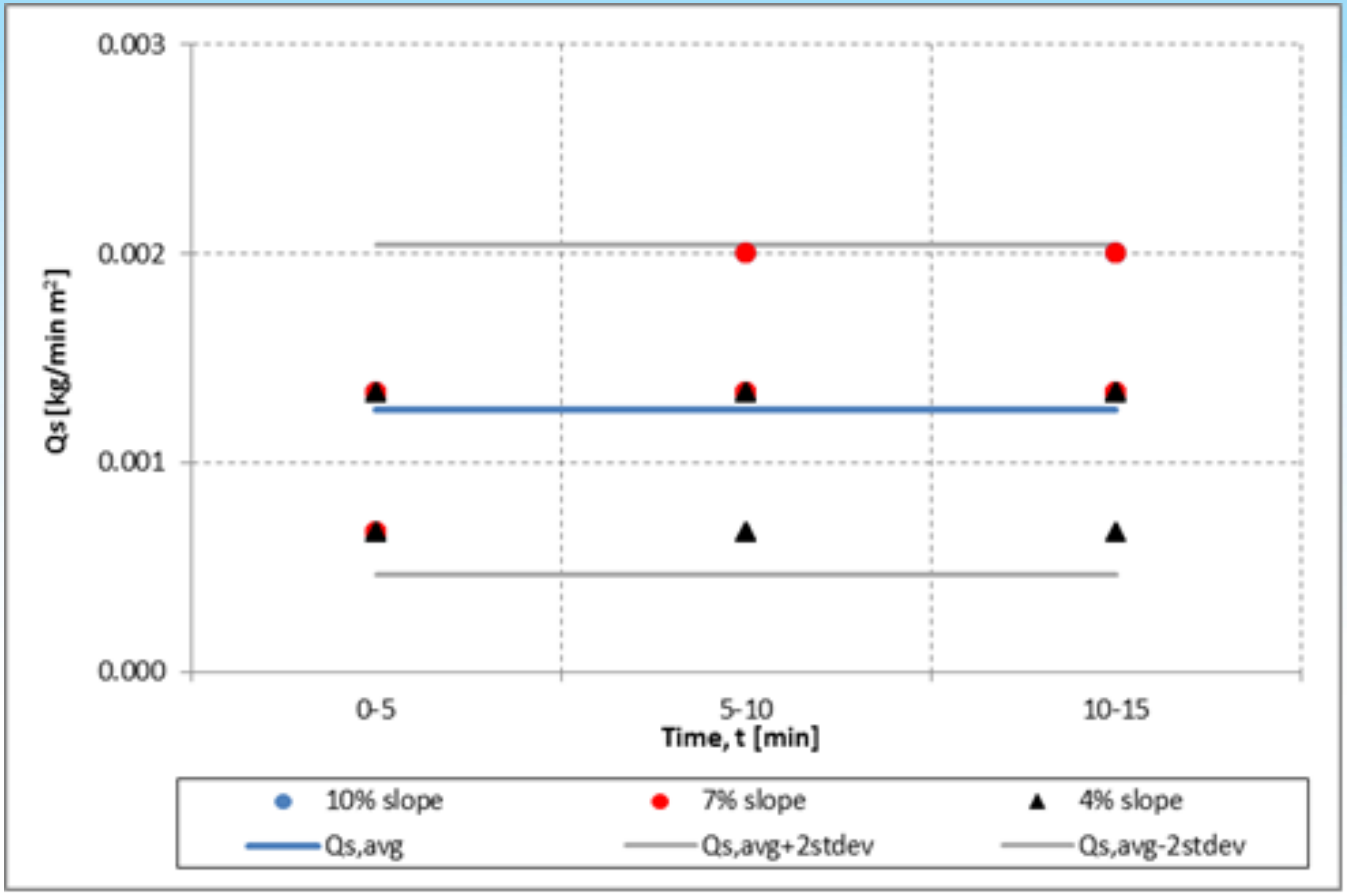
- Oscilating nozzle rainfall simulator,
- Concrete slab (3 x 1 m),
- Draining channel,
- Vessel.

Laborathory installation

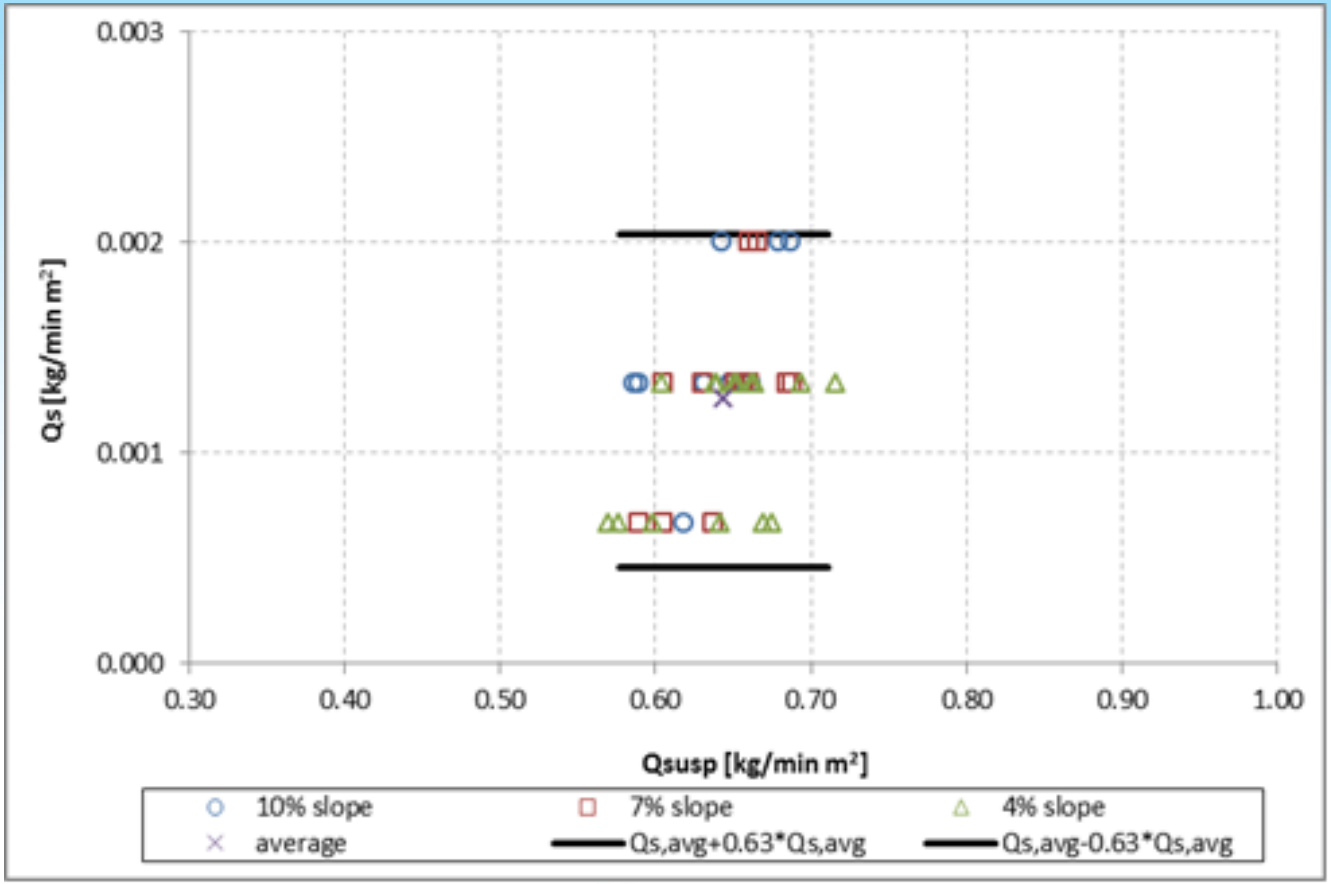
Methodology

- 1 kg of sand was uniformly spread over the surface (0.06 – 2 mm grain size),
- Tests were made for rainfall with constant intensity during 15 minutes (120 l/s ha),
- Runoff was caught in vessels in 5-minute time intervals during rainfall for surface inclinations of 4%, 7% and 10%,
- Sand was separated from the water by filtrating through geotextile, and then dried at 105^{o}C up to a constant weight.

Results



Results



$$Q_s = \frac{Q_{susp}}{480}\left(1 \pm 0.63\right)$$

Conclusion

Average suspension mass flow and sediment mass flow rates are:

- independent of the slope of the concrete slab,
- constant for tested time intervals, and
- in a linear correlation.