

Impacts of Heavy Traffic Generators on Iowa Local Roads

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Iowa State law limits weight of vehicles by axle and gross (total) weight. These laws standardize traditional vehicles by size and weight. However, the agricultural (ag) implement industry is a vehicle sector that has changed substantially in recent years, most notably the vehicles are being manufactured larger. This has resulted in heavier implements that, if filled with product to capacity, are substantially overweight. Similarly, there are other heavy traffic generators (non-divisible vehicles, trucks carrying wind turbines, transport from-to Confined Animal Feeding Operations [CAFO], especially hog confinements, and so on) that can potentially become overweight. To have insight of impacts of such heavy traffic generators on Iowa local roads, this study discussed lessons learned from a series of full-scale traffic tests conducted at the Minnesota Road Research Facility (more commonly known as MnROAD) and other previous studies conducted for Iowa local roads. Numerical analyses were also carried out to compare pavement responses of heavy farm equipment with those of a standard 356 kN (80 kips) five-axle, semi-trailer truck for assessing relative pavement damage caused by heavy farm equipment. The study findings reveal that seasonal change, traffic wander, vehicle loading/configurations, pavement thickness, and modulus of subgrade support are all important factors that should be considered in designing pavement subjected to heavy farm equipment loading, and recommend to develop methods and tools which Iowa county engineers can use to evaluate major heavy traffic generators for their impacts on the life of Iowa county road structures and their service lives.

Keywords: heavy traffic generators; local roads; numerical analyses; full-scale traffic tests