

VIBRATIONS AND MECHANICAL SHOCKS IN DIFFERENT ROADS DURING THE
TRANSPORT OF DAY-OLD CHICKES

VIBRAÇÕES E CHOQUES MECÂNICOS EM DIFERENTES ESTRADAS DURANTE O
TRANSPORTE DE PINTOS DE UM DIA

AÉRICA CIRQUEIRA NAZARENO^{1*}, IRAN JOSÉ OLIVEIRA DA SILVA¹, ANA CAROLINA DONOFRE¹,
FREDERICO MÁRCIO CORREA VIEIRA²

¹Universidade de São Paulo (USP), Escola Superior de Agricultura “Luiz de Queiroz”,
Departamento de Engenharia e Biosistemas, Piracicaba, SP, Brazil.

²Universidade Federal do Paraná (UFPR), Dois Vizinhos, PR, Brazil.

*e-mail: aerican@yahoo.com.br

The vibration and mechanical shocks that occur during the transport of chicks may act as a stressor of birds. The quality of roads also has serious impacts on load, because most vehicles are not designed to reduce vibration felt by the animals. The aim of this study was to evaluate the transport of day-old chicks on different roads, through vibration and shock of the trucks. The research was conducted in a poultry integrator company located at state of São Paulo, through the monitoring of 11 shipments of chicks. The day-old chicken transport truck (approximately 8 x 2.50 m, 2.50 m high) was environmentally controlled, with three box stacks (left, right and center) spaced 0.7 m and two axis, with a capacity of 630 boxes of chicks, totaling an average of 63,000 chicks. The vibration levels reviews RMS X (vertical vibration), RMS Z (horizontal vibration) and RSS (general acceleration) and shocks on the dirt and asphalt roads were recorded using three triaxial accelerometers. The experimental design was completely randomized in an 11 x 2 factorial. Difference in vibration levels between dirt roads and asphalt, for RMS X, RMS Z and RSS, with the highest means were observed on the dirt road ($P < 0.05$). However there was no statistical difference between the roads to the RMS Y (Table 1). This event can be attributed to the large irregularities and holes in dirt track. Generally these vibrations were above the ideal range (0.315 m/s). These high levels of vibration may have acted as a stressor during transportation of chicks. No statistical difference was observed in the number of collisions between the different types of roads (dirt and asphalt) for the three charge displacements RMS X, RMS Y and RMS Z, where the highest values were found in the average shock asphalt road. The amount of shock on the roads did not show the same behavior for vibration levels ($\text{ground}_{\text{shock}} < \text{asphalt}_{\text{shock}}$; $\text{earth}_{\text{vibration}} > \text{asphalt}_{\text{vibration}}$), because the asphalt road offers the best conditions for paving, which provides a higher speed of the vehicle. It follows that the worst vibration levels (RMS X, RMS Z e RSS) occurred on the dirt road, with mean values of 2.2, 3.3 and 25.8 m/s. The largest amounts of shocks occurred for all shifts assessed loads (vertical, horizontal left and right side) were observed on the asphalt road, average values of 453, 52 and 554 shocks.

Table 1. Average vibration levels on different types of roads during the transport of day-old chicks values

Road types	Vibration levels (m/s)				Number of shocks		
	RMS X	RMS Y	RMS Z	RSS	RMS X	RMS Y	RMS Z
Asphalt	1.7 b	9.0 a	2.0 b	14,0 b	453 a	52 a	554 a
Dirt	2.2 a	8.7 a	3.3 a	25,8 a	134 b	7 b	97 b
Test Chi-square	4.87*	1.24ns	20.16*	18,24*	8,35*	2,91ns	18,87*

In the same column, averages followed by the same letter do not differ among themselves to the probability level of 0.05 using Test Chi-Square. ns: non-significant, *: significant ($P < 0.05$).

Keywords: pre-gate operations, transporting chicks, types of roads.

Acknowledgments: National Council for Scientific and Technological Development (CNPq) and Research Foundation of the State of São Paulo (FAPESP).