The effects of driving events on the stability and resting behaviour of cattle, young calves and pigs

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Abstract

The welfare of animals in transit may be affected by driving events, such as acceleration, braking and cornering. The relationships between driving events and the behavioural responses of the animals were examined. A single-deck, non-articulated vehicle was fitted with a video-recording system, GPS and tri-axial accelerometer. Two drivers each drove three standard journeys (two 3-h stages on different types of roads) for each animal type. Six different groups of five cattle (Bos taurus), ten calves and ten pigs (Sus scrofa) were each transported on separate journeys. Cattle stood still for most of each journey. Calves spent more time lying down during the second stage of the journey than during the first. Although pigs spent some of the time lying down, they spent more time sitting down and this time was greatest on a motorway and during the second stage of the journey. Frequent adjustments to maintain stability were required in response to acceleration, braking, cornering and rough road surfaces. Some animals experienced repeated falls. Falls occurred after a series of different types of events. The fewest losses of balance occurred on the motorway. As a motorway is a limited access multi-lane carriageway not crossed on the same level by other traffic lanes, the driver does not normally undertake frequent vehicular adjustments to respond to road features. Therefore, motorways give animals an opportunity to rest and avoid discomfort from repetitive driving events. If drivers anticipate potential driving events and prepare for them, it will reduce the likelihood and severity of losses of stability.

Keywords: animal welfare, behaviour, calves, cattle, pigs, transport

Introduction

Many factors can affect the welfare of cattle (Bos taurus), calves and pigs (Sus scrofa) during transportation (Grandin & Gallo 2007; Lambooy 2007). One important factor is the risk of injury, distress and disturbance to rest that can occur as a result of vehicle movement. For example, sudden braking can result in cattle sliding to hit each other and the interior of the vehicle, and some may fall over (Lambooy & Hulsegge 1988). In a series of papers, summarised by Tarrant (1990), it was shown that cattle lose balance frequently in response to driving events, but on most occasions they move their feet in time to regain their balance. Gebresenbet et al (2011) considered that driving conditions (road surface and curvature), poor driving style (variations in speed and vibration) and poor suspension were the main factors causing vibration and loss of balance experienced by animals during transport.

Gebresenbet et al (2011) showed that vibration from the floor of a moving livestock vehicle (recorded using an accelerometer) can be transmitted to cattle (wearing an accelerometer on their chest). There have been several studies on the relationships between vibration and the physiological and behavioural responses of the animals. These studies have shown that vibration: is stressful in both calves (Locatelli et al 1989) and pigs (Perremans et al 1998); is aversive to pigs (Stephens et al 1985); can disturb the resting behaviour of pigs (Bradshaw et al 1996a,b; Peeters et al 2008) and might cause motion sickness in pigs (Randall & Bradshaw 1998).

Accelerometer recordings made in three axes (longitudinal, lateral and vertical) from a livestock vehicle, driven on a variety of road types, will consist of a combination of vibrations and shocks. Rouillard (2002) described shocks as short-duration, relatively high-amplitude events that occur randomly and are produced in response to a driving event, such as braking, cornering or a pothole: “In vehicles, shocks are often manifested as large and short-duration vibration bursts and usually occur within a background of random vibrations”. When shocks are identified the amplitude of the event lies outside the normal background vibration (Rouillard 2002).

Since random high magnitude acceleration events (shocks) are likely to pose the greatest risk of loss of postural stability, this study examined the effects of acceleration in