

## The Dumisani Loading Profile

It is well known that sugarcane vehicles in South Africa are, on average, under-loaded by approximately 12%. Ideally, one should invest in an on-board weighing system in order to maximise payloads. It has been shown that these systems will pay for themselves within two seasons. In the absence of such a system, the Dumisani loading profile can assist in achieving optimum payloads.

Dumisani Sibuyi, a UKZN Agricultural Engineering graduate, performed interesting calculations on sugarcane vehicles. Traditionally, sugarcane trailers are loaded flat to the top (Figure 1) and if the cane has a low density, additional “bread loaf” loading will commence where cane towards the centre of each trailer will exceed the top structure of the trailer (Figure 2). However, one needs to understand that, in order to obtain the maximum legal payload, one cannot simply load cane uniformly into the trailer. Each axle is subject to a maximum legal load, and the distribution of the load will be dictated by the axle limit. In other words, it is not only about how much cane is loaded into each trailer, but the location of the cane inside the trailer also matters. Mill weighbridges weigh-in the entire vehicle and chances are good that many vehicles in the sugar industry may be operating with over-loaded axles.

Further calculations on typical interlink and rigid-drawbar vehicles were carried out and the ideal loading profiles are illustrated in Figure 3. These results suggest that a cane loading profile should match the axle loading distribution. This profile, which will differ from vehicle to vehicle, is known as the ‘Dumisani Profile’.

It is important to note that the profiles in Figure 3 illustrate the ideal loading profiles when a product with a consistent density is to be loaded. Cane densities in a single consignment can be quite varying and the Dumisani Profile could be used by the loader operator to respectively decide where high density cane and where low density cane should be placed inside the trailer. Markings could be added to the sides of vehicles to guide loader operators with respect to these decisions. Unfortunately most sugarcane vehicles have slightly different designs and calculating the Dumisani Profile for a vehicle is relatively complicated. Ideally an engineer will have to be consulted to calculate these profiles. Contact Carel Bezuidenhout on 033-260 5703 or Email: [BezuidenhoutC@ukzn.ac.za](mailto:BezuidenhoutC@ukzn.ac.za).

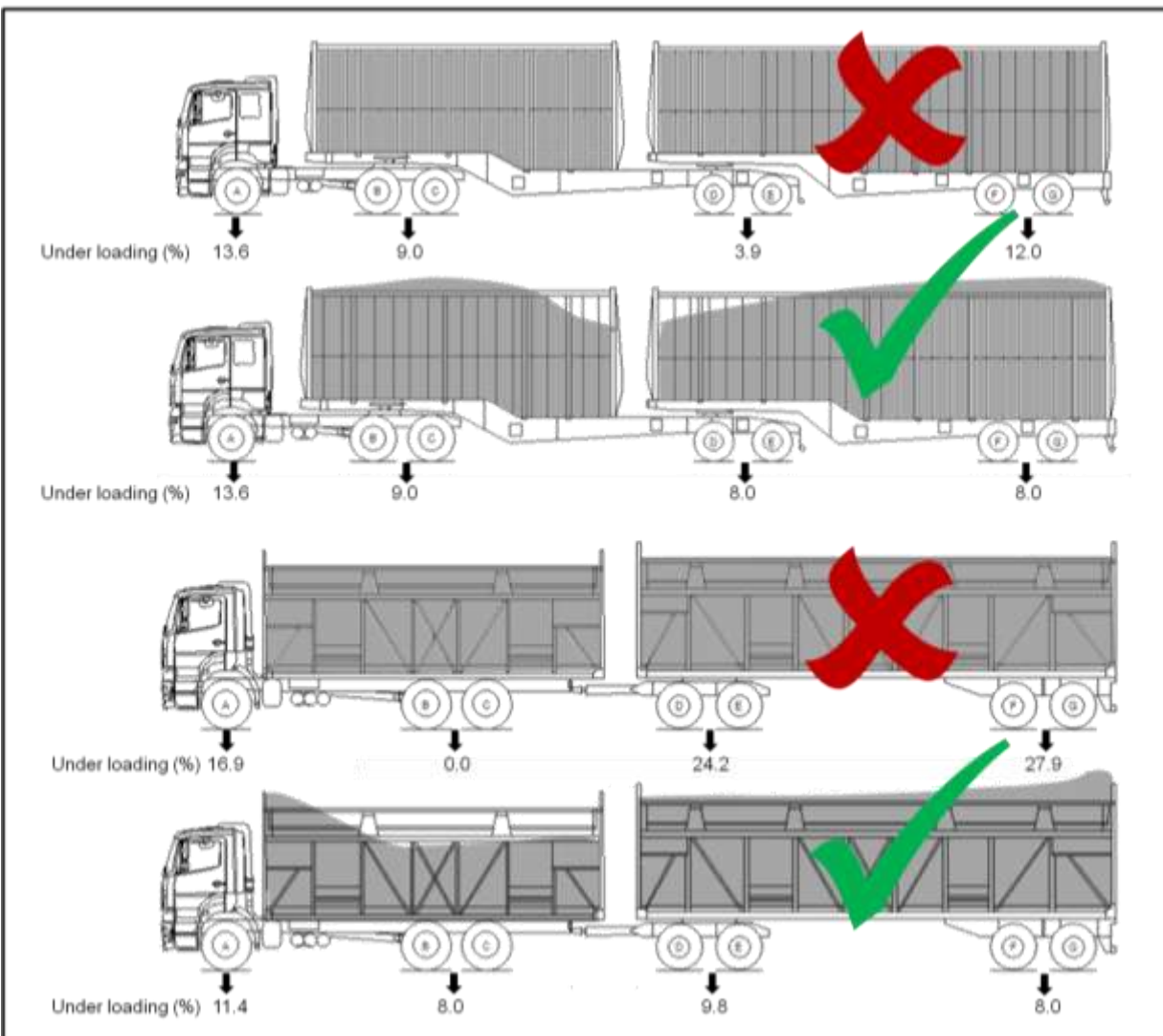
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**Figure 1.** A sugarcane vehicle loaded to the top (photo: Samantha Moodley).



**Figure 2.** “Bread loaf” loading (photo: Samantha Moodley) .



**Figure 3.** Dumisani loading profiles for two typical sugarcane vehicles (as published in *The International Sugar Journal*, Vol 112).