



Customer Trial of DSH (Dust Suppression Hopper) Systems versus existing technology

Trial Location: New South Wales, Australia

Location Type: Port loading facilities

Date of Trial: February 2013

Phase 1

The DSH Dust Suppression hopper was installed on un-loader A to be used in the discharge of 28,000t of soya bean meal from a vessel.

Un-loader B is also being used in the discharge of the soya bean meal but it still has the original truck loading chute - the same chute that was removed from Un-loader A.

As soya bean meal is a dusty cargo and both A & B are to be used at the same time in the discharge, it was an ideal time to compare the new DSH Systems dustless hopper in operation against the original truck loading chute in the same operation.



Figure 1: This is the initial height the hopper was installed prior to loading the first truck

At this setting it took un-loader A approximately 6 minutes to load one truck and there was minor spillage occurring over the top of the hopper - at the same time Un-loader B was taking approximately 2 minutes 40 seconds to load a truck.

After lowering the hopper height to increase the spout opening size and adjusting the un-loader slide gate that controls the flow rate into the dustless hopper, the truck loading rate was reduced to an acceptable 3 minutes and there were no spillages from the dustless hopper. (Un-loader A)



Figure 2: Un-loader A (DSH Hopper) loading the first truck after adjustments



Figure 3 In comparison at approximately the same time, Un-loader B loading trucks.



Figure 4 Un-loader A DSH Hopper in operation loading truck after further adjustments.



Figure 5 Un-loader B truck loading in comparison at approximately the same time.

Phase 2

DSH Systems Dustless Hopper has now been used on the discharge of 4 different cargoes.

Soya Bean Meal – 28,000mt

DAP – 500mt

MAP - 5,422mt

MES10 - 2,350mt

It has shown to be most effective on the dusty soya bean meal cargo with a significant reduction in dust during truck loading and only minimal time difference compared to the truck loading rate using the original truck loading chute.



Figure 6 Soya bean meal Un-loader A

The truck loading rate of fertilizers MAP, DAP and MES10 showed an increase in time to complete a load compared to the original loading chute.



Figure 7: DAP Fertilizer Un-loader A

The truck loading rate varied significantly:

Soya Bean Meal:	approx. 3 minutes	(original truck loading rate 2 min 30sec)
DAP fertilizer:	approx. 1 minute 30 seconds	(original truck loading rate 1 min)
MAP fertilizer:	approx. 3 minutes	(original truck loading rate 1 min)
MES 10 fertilizer:	3 minutes 30 seconds	(original truck loading rate 2 min)

The loading rate is controlled by the un-loader slide gate positioned directly above the DSH Hopper and is set to enable the maximum amount of cargo fed into the DSH hopper without overflowing out of the hopper.

To enable a quicker loading rate the DSH hopper was modified to provide a larger spout opening.

The height of the installed DSH System is perfect to give adequate clearance from the top of the truck trailers.

Conclusions of test

- 1) During Phase 1 only soya bean meal was loaded. On first installation the hopper loading was slower than the traditional chute, but after adjustment loading time was very similar. Significant dust reduction was observed by using the DSH System.
- 2) During Phase 2 further soya bean meal was loaded as well as a variety of fertilizer products. Again significant dust reduction was achieved by using the DSH System on all products. Loading time on soya bean meal was very similar with both systems. Loading time of the fertilizer products was slower with the DSH due to different bulk densities of this product over the soya bean meal.
- 3) Based on the significant dust reductions achieved, the DSH hopper on un-loader A was replaced with a modified model and the same unit was also installed on un-loader B. All products are now being loaded at the **same speed** as the traditional unit, but with **massive dust reductions**.