

Project Scope

Bulk Solid Material: Coal

Equipment: Central transfer on a slewing/luffing stacker operating at 8000t/h and speeds over 5.6m/s

Aim: Development of conceptual design in view of structural constraints

Conceptual design of a stacker transfer was performed utilising the lumped parameter continuum analysis approach. The approach relies on bulk solid material properties obtained from standard flow property tests which are directly measured in TBS laboratories.

The scope of the project involved designing a curved impact plate (hood) and loading chute (spoon) through which material flow is re-directed. The head height available and horizontal position to the slew (rotation) centreline was restricted by an axisymmetric transition section (to be installed by others). Further difficulty in design was also attributed to steep conveyor luffing inclination of 12° to 15° and machine slewing range of 40° to 75° (in plan view).

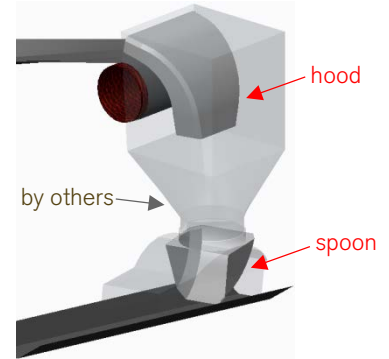


Figure 1: Design Developed

Design and Research

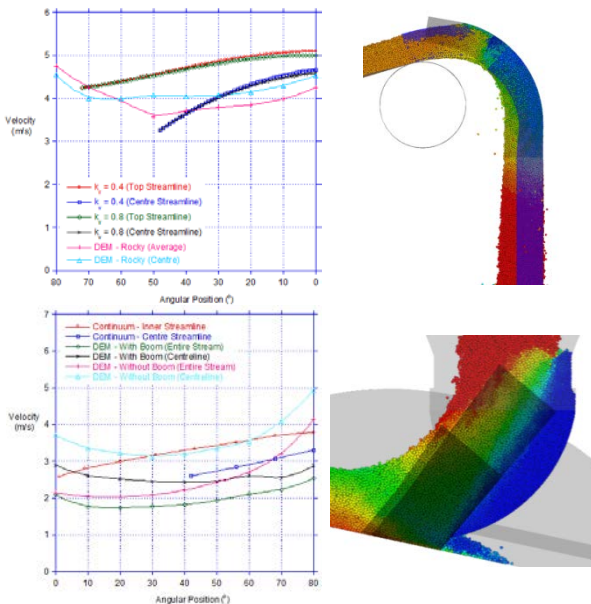


Figure 2: Continuum and DEM Analysis

Principles of transfer chute design developed by TBS over the course of over 40 years were applied. The most favourable design, under the imposed structural constraints, was selected and put forward to the client.

Following successful commissioning, an in depth study of flow through the transfer was performed, applying continuum analysis in parallel with calibrated Discrete Element Modelling (DEM).

Excellent correlation was observed between the two analysis techniques and also to site observations. The use of DEM as a flow visualisation tool allowed for a refinement of the implementation of the continuum analysis to such systems.

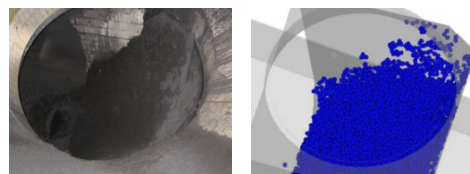


Figure 2: Comparison to Site (Spoon)

Project Outcomes

The transfer has been in operation for over 6 years, handling tonnages above the original design capacity.

Subsequently, designs based on the original, developed by TBS, were installed on a further two stacking machines.



Figure 3: Transfer Currently Handling up to 8300t/h

For more information regarding this project or if you wish to make an enquiry, please contact:

TUNRA BULK SOLIDS

Dr Dusan Ilic

Newcastle Institute for Energy and Resources (NIER)
The University of Newcastle
Off Vale Street
Shortland NSW 2307, Australia



Email: enquiries@bulksolids.com.au
Ph.: +61 2 4033 9055
Fax: +61 2 4033 9044
<http://www.bulksolids.com.au>

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