GRAIN HANDLING WITH DSI SANDWICH BELT CONVEYOR

A sandwich belt conveyor uses two conveyor belts, face-to-face, to gently but firmly contain the product being carried, hence making steep incline and even vertical-lift runs easily achievable. Sandwich Belt high angle conveyors are proven, versatile systems for elevating materials continuously at steep angles to 90°. Widely varying industries have exploited the benefits of these conveyors. Besides various grains, materials handled include coal, refuse, coarse copper ore, hot clinker, municipal sludge, wood chips, gypsum, slag, excavated earth and RDF. Throughput rates vary from 0.27 to 4,000 t/h with conveying profiles varying widely and elevating heights ranging from 3.66 to 175m.

RESEARCH AND DEVELOPMENT

The modern Sandwich Belt high angle conveyor technology was developed by J. A. Dos Santos, founder and president of Dos Santos International. Material degradation was a concern that was addressed at the beginning of the development. Sandwich Belt conveying has great potential for handling friable or damage-prone materials to tall silos where they are so often stored. It was known, by the nature of the hugging pressure, that this was a gentle system so the next step was to demonstrate this.

GRAIN QUALITY

Damage testing was performed on three (3) USDA Grade 1 grains to demonstrate the gentle distribution of the hugging pressure on the sandwiched material. Five one-bushel samples were loaded into oversized burlap sacks from each of a common batch of soybeans, wheat and seed corn. The first bushel of each grain was set aside to serve as the control sample, while the next four bushels were conveyed at 60 degrees, the full length of the 1524mm (60”) belt width demonstration unit, two, four, six and eight times respectively for corresponding conveying distances of 45.7 meters, 91.4 meters, 137.2 meters and 182.9 meters. Samples from each bushel sack were then analyzed at a State of Alabama Department of Agriculture laboratory for the various forms of damage and contamination, and at the Alabama State Seed Laboratory Department of Agriculture and Industries for germination potential. The results showed **NO** damage to any of the three grains tested, as a result of conveying in the high angle conveying unit.

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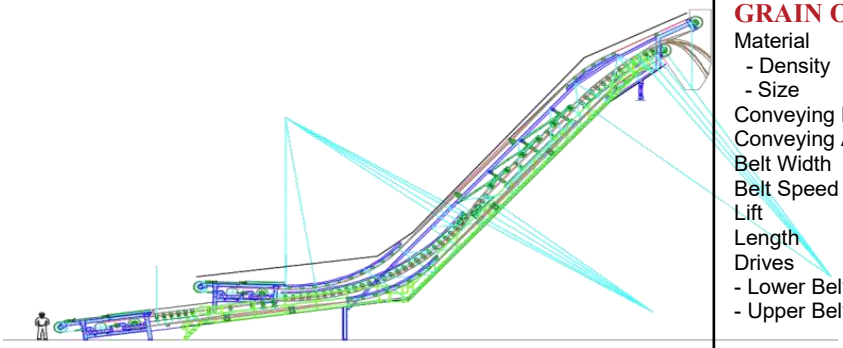
DOS SANTOS INSTALLATIONS IN GRAIN

Commercial installations in grain, by J.A. Dos Santos, began in the 1990s before the founding of Dos Santos International in 1997. These earlier units are summarized in the table below.

Type of installation	Conveying Rate	Conveying Angle
Self Unloading Ship	584 t/h	90 degrees - C shaped
Self Unloading Ship	1361 t/h	90 degrees - C shaped
Grain Distribution Terminal	907 t/h	65 degrees
Elevating to Shiploader	2000 t/h	53.5 degrees

The latest DSI installation is presently in engineering, scheduled to begin operation in August of 2021. Depicted and summarized below, this unit features the highest volumetric rate to date in grain and the second highest in all materials.



SANDWICH CONVEYOR ELEVATING GRAIN ON FLOATING TERMINAL

Material	- Grain
- Density	- 0.77 t/cu-m (48 PCF)
- Size	- 101.6 mm (4") minus
Conveying Rate	- 2268 t/h (2500 STPH)
Conveying Angle	- 50 degrees
Belt Width	- 2134 mm (84")
Belt Speed	- 4.57 m/s (900 FPM)
Lift	- 18,288 mm (60')
Length	- 36,576 mm (120')
Drives	
- Lower Belt	- 149 kW (200 HP)
- Upper Belt	- 112 kW (150 HP)

FURTHER ADVANTAGES OF THE DSI SANDWICH CONVEYOR:

- LOW POWER/ENERGY REQUIREMENTS
- NO DEGRADATION OF MATERIALS
- ALL CONVENTIONAL CONVEYOR PARTS
- SMOOTH SURFACED RUBBER BELTS THAT CAN BE CONTINUOSLY SCRAPED CLEAN
- HIGH RELIABILITY WHICH ENSURES UNINTERRUPTED OPERATION
- LOW MAINTENANCE COSTS.

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