PHONE/TEXT/WHATSAPP
+1 770 423 9895

info@dossantosintl.com
DosSantosIntl.com

531 Roselane St - Suite 810
Marietta, GA 30060

DOS SANTOS INTERNATIONAL

Tuesday, July 23, 2024

FOR IMMEDIATE RELEASE

GOING DOWNHILL ISN'T SO BAD

Marietta, GA - Typically, when you hear the word downhill, it has a negative connotation. But when downhill refers to conveying bulk materials, it can actually be a good thing. Downhill conveyors are potential energy sources. Their energy can be captured and used. When taking advantage of a downhill landscape, downhill conveyors are the most efficient equipment at mines and plants.

CONFORMITY TO LANDSCAPE

The ability of the Sandwich Belt high angle conveyor to conform to the irregular profile of the landscape facilitated its use at a Virginia, USA coal preparation plant to haul coal refuse from the plant to the dump site along a steep mountain path. The Sandwich Belt conveyor replaced haulage by two aerial tramways which were supplemented by additional truck haulage. The aerial tramways traveled conspicuously above the mountain slopes and created a black streak of spillage under their respective travel paths. Steep curving ramps for the trucking scarred the landscape, while the trucks polluted the air with fumes, particulates, and noise, and created the potential for disaster from traffic accidents. The Sandwich conveyor eliminated these problems while offering conveying capacity higher than the previous combined system. It is interesting that high angle as well as conventional conveyors were considered for this application. However, the latter required much elevated structure, was obtrusive on the landscape and needed additional transfer points, a potential source of spillage.

TWO FOR ONE – DOWNHILL HAC SAVES THE DAY

Similarly, a downhill HAC at a Venezuelan phosphate mine combined the duties of a gathering conveyor from beneath the storage pile and an overland conveyor flight, eliminating a transfer and much elevated structure.

In 1991, the Venezuelan chemical giant, Pequiven developed a phosphate mine in the mountains with a six-flight overland conveyor system to transport the product down to their port facilities. The overland system was to be 2.76 kilometers long with an elevation drop of 437 meters. The system ran from the mine's phosphate storage barn to the port.

Geotechnical investigation discovered karst topography at the storage barn's intended location, making the site unsuitable for supporting the foundations and storage pile loads. The storage barn was thus moved to a competent location that placed it 133 meters from the tail of the second flight and 38 meters above. The steep, downhill transport path was easily accomplished by a downhill HAC that replaced the first overland conveyor flight. Indeed, the HAC, with its long gathering tail additionally replaced the storage barn's gathering conveyor.

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The downhill system offered great potential for energy production. With 932 kW of connected drive power, more than 500 kW could be harnessed continuously when running at the design rate. Sadly, in 1991, the cost of variable frequency drives (VFD) and their controls discouraged the harnessing of such power. It was more typical to exhaust the power as heat into the atmosphere. Such was the case in Venezuela.

The downhill HAC at the Pequiven phosphate mine in Venezuela.

Thankfully, today the cost of VFD drives and controls allow us to use this energy source, while extending the typical equipment life.

WHAT COULD HAVE BEEN AT LOS FILOS GOLD MINE

In 2009, a great opportunity was missed at the Los Filos gold mine in central Guerrero State in central Mexico. But with the innovative minds at Dos Santos International, the loss became a gain and leaves the door open for another opportunity as news of the Los Filos mine reopening has been announced.

Dos Santos International was asked to develop an alternative conveying from the crusher to the leach pads at the Los Filos gold mine. A previous system conveyed the ore via a glory hole ore pass and an underground conveyor, through the hill at its base. An agglomeration drum mixed in the agglomerate before final delivery to the leach pads.

This conveying system experienced material flow problems right from the start, especially during heavy rains. The sticky ore tended to plug up the ore pass. Geological instability ultimately collapsed the ore pass, putting the transport system out of service only four months into its operation.

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The logical, most direct and economical path was over the same hill (rather than under). The path required a down-hill high angle conveyor. Thus, Dos Santos International was approached about their DSI Sandwich Belt high angle conveyor. Being the best solution, DSI was awarded the contract in March 2009 for a downhill system.

Depiction of the DSI GPS that was abandoned due to geological instability.

The DSI GPS (Gently Pressed Sandwich) high angle conveyor utilized fully equalized pressing rolls to impart a gentle hugging pressure onto the top belt thus onto the conveyed material in the Sandwich, developing the materials internal friction so sliding did not occur along the high angle incline.

This downhill GPS promised to deliver the gold ore efficiently to the leach pads and also offered the substantial bonus of free electrical power to the mine grid. When operating at the design rate of 1000 t/h the system would generate 220kW.

Concerns with geological instability remained, especially along the path of the DSI GPS. Further geological scrutiny ultimately led to abandoning this path altogether, thus abandoning the DSI GPS.

M3 was again tasked with developing an alternate conveying path. This time a conventional conveyor system was developed, following the already developed truck ramps. Dos Santos International again submitted their proposal for the project. The overland conveyor system was awarded to DSI May 19, 2009.

The DSI expertise proved particularly advantageous on this project. The original ten-conveyor-flight system was rationalized to only seven flights by amalgamating with horizontal curves. Additionally, the third conveyor flight is specially engineered to accomplish the agglomeration by mixing through five intermediate tripped transfers. The enroute agglomeration, conceived by Goldcorp, results in substantial savings by eliminating the need for the additional agglomerating drum.

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The predominantly downhill path presented great savings opportunities.

The overland conveying path is predominantly downhill. While this presents the normal controlled starting and stopping problems, it also presents great savings opportunities. The downhill flights are decisively regenerative. Additionally, the drive motors, now generators, feedback power into the grid which powers the other mine equipment. These carefully engineered conveyors are equipped with variable frequency drives to ensure operation at maximum efficiency.

While the opportunity to offer efficiency in carrying with the DSI GPS was ultimately missed, the expertise of Dos Santos International was able to offer cost savings solutions and a successful haulage system to continue operations at the Los Filos gold mine, and can continue in other downhill projects in the future.

ABOUT DOS SANTOS INTERNATIONAL

Dos Santos International is the world's foremost authority on Sandwich Belt high angle conveyors. The company was founded and is currently led by the inventor of the system, Joseph Dos Santos. DSI is known for its extensive worldwide experience in sales, engineering, and construction of bulk materials handling systems and equipment. This has included major contributions that have expanded the range of bulk handling and transport solutions. Most notably advances in Sandwich Belt high angle conveyors have led to their worldwide utilization. The expertise of DSI spans a wide range of materials handling systems and equipment including high angle conveyors, high powered, high capacity, high lift slope conveyors and long overland conveyors utilizing the very latest technology.

To learn more about Dos Santos International and their most reliable and economical solution for your steep angle and vertical high-tonnage conveying requirements, visit their website at www.dossantosintl.com.

CONTACT:

Amy D. Duncan, Marketing Manager
+1 770-423-9895
aduncan@dossantosintl.com