

Press Release.

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World Tallest Autonomous Forklift at Singapore Storage and Warehouse

Jul 2022, Singapore.

Linde Material Handling successfully handed over the world tallest autonomous forklift to Singapore Storage & Warehouse (SSW), located in Singapore. It all started with SSW wanting to convert the manually operated very narrow aisle (VNA) forklifts to autonomous VNA forklifts as part of the Company's innovation drive. More premium solutions like automated storage and retrieval system (ASRS) using stacker cranes were considered, but SSW wanted the flexibility of aisle change that VNA could provide to suit its operations. In addition, VNA forklift is a more efficient use of resources with the desired throughput. However, the challenge for autonomous VNA forklift was the height. There were no past references from any robotics company at such height.

Since its beginnings in 1987, Singapore Storage & Warehouse has been the preferred logistics service provider to its wide base of customers and stakeholders in Singapore. The Company has an established track records of helping customers to successfully manage their inventory and logistics operations under normal business conditions and stepping up to support business partners during exceptional times, including emergencies.

Ong Swee Keong, CEO of SSW, commented: We are very happy to be partnering Linde for this automation project. The productivity gains have been impressive, and I am glad that the dedication and hard work put in by everyone in SSW, Linde, BALYO and our partners for this project has paid off. As SSW continues to transform and grow, we look forward to achieving even more business success with our reliable partners".

Now, SSW has started operating 4 units of Linde Material Handling autonomous VNA forklift for the autonomous storage and retrieval of pallets at a never-seen-before height of 16.8 meters. This is the first site in the world that is operating autonomously at such height. Manually operated VNA forklifts can reach up to a maximum of 18 meters. Past installations of autonomous VNA forklifts were able to operate at up to 13 meters, and this new innovation at SSW created a new world record at 16.8 meters. At the maximum height, the VNA forklift is still able to handle loads of up to 750kg.

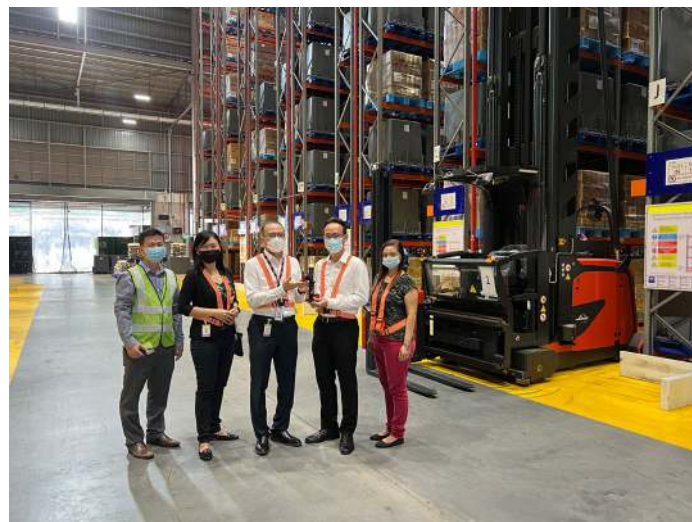
This Linde Robotics solution, with the unique Driven navigation system by BALYO, does not require any additional infrastructure investment in the warehouse (like reflectors or magnetic strips), and it can be re-programmed quickly to adapt to changes in the material flow in the warehouse with its simultaneous localization and mapping (SLAM) navigation system. With the space constraints

and the tight labour market in Singapore, such tall and autonomous VNA forklifts is an ideal solution for warehouse and logistics operations.

“Linde Robotics solution is built on conventional forklifts which makes it more reliable with common spare parts and services. This greatly improves the uptime as compared to highly customized solutions” said Mr Tee Seng Chuan, Executive Director of Linde Material Handling. “In the unlikely event of any major failure in the automation, each forklift can be operated manually with a simple switch on the forklift, and the operations can continue to run seamlessly.”



Pascal Rialland, CEO and Chairman of BALYO, commented: This project shows the tremendous superiority of Linde-BALYO’s technology on the high-bay storage and VNA applications. Singapore has been the perfect hub to launch applications at extreme heights due to space scarcity and customer engagement towards robotics. We will pursue our commitment to engage further with Linde and their teams to expand this success at further SSW sites and other warehouses around the globe.



Management Team Photo

About Linde Material Handling

Founded in 1904, Linde Material Handling GmbH, a member of the KION Group, ranks among the world's foremost makers of forklift and warehouse trucks and is the market leader in Europe. Linde is a global premium brand and a technology leader that has many years' experience of hydrostatic drive technology and meets customers' highest requirements regarding technology, efficiency, functionality and design. As an international company, Linde Material Handling has a global sales and service network with offices in over 100 countries.

The regional centre in Singapore, Linde Material Handling Asia Pacific Pte Ltd leverages the strength of global leadership in material handling equipment with local teams of expert consultants who understand the needs and provide the solutions to businesses across countries in South and Southeast Asia.

Balyo is the technology partner of Linde Material Handling to transform standard forklift trucks into intelligent robots under the umbrella of "Linde Robotics".

Press contact:

Mr. Aziz Rahmat

Phone: +65 6690 9326

E-Mail: aziz.rahmat@kiongroup.com

Linde Material Handling Asia Pacific Pte Ltd

No. 5 Loyang Way

Singapore 508720

www.linde-mh.com.sg