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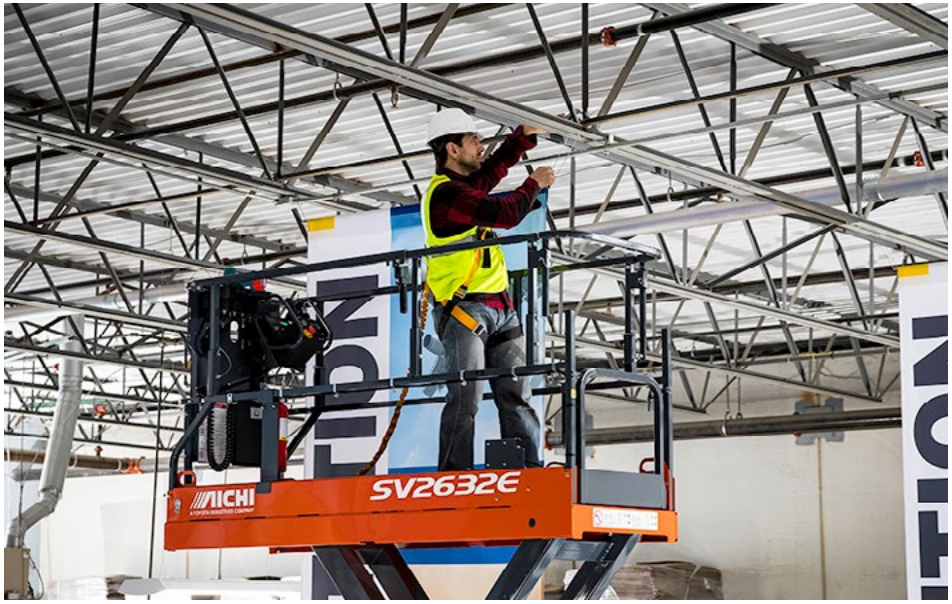
rental equipment register

The Evolution of Scissor Lifts Continues

New technology enters the market.



Since Charles Larson of the United States was granted a patent for the first scissor lift in 1963, scissor lifts have grown to become the "Swiss Army Knife" of the mobile elevating work platform (MEWP) field.

In his patent description, Larson's original design relates to "an extensible lift mechanism for elevating a load" He goes on to say, "this invention relates to such mechanism including an opposed pair of scissor mechanisms, each of which includes a pair of scissor arms pivotally connected together, where relative pivotal movement of the arms accompanies extension of the lift mechanism." From this simple description, an entire industry grew and prospered.

Over the following years a number of companies were formed to manufacture scissor lifts, and in the early 1970's the first market-ready machines became available. Manufacturers continued to develop the product, and scissor lifts grew larger, taller, and more robust. As the industry grew, guidelines for use and manufacture were drawn up and manufacturers added safety features to protect workers. Companies also began offering a variety of different power sources.

Scissor lifts are available in two types – electric (battery) powered for use primarily indoors on a firm level slab surface, or engine powered (often called rough terrain scissors) for work outdoors or use on uneven surfaces. Engine powered machines solve the challenge of moving on terrain where different tires or more powerful engines and outriggers are needed to level the vehicle. In addition to these machines, there are also dual fuel models that operate on both gasoline power for outdoors use, and propane for emission-free use indoors.

Electric scissor lifts are by far the most popular and most commonly used MEWP on most construction jobsites or for maintenance in a factory, school or other building because they are so versatile. On large building

projects, it is not uncommon to see hundreds of these machines hanging ventilation ducts, installing drywall, or doing a myriad of other chores. And when used for maintenance, the lists of jobs they can complete are as varying as they are challenging.

With versatility like this, scissor lifts quickly found their way into many industries including construction, maintenance, and others. Mechanical and HVAC engineers use them to install overhead ducting and football coaches use them to film games from high above the field. Arborists use them to trim trees and aircraft workers clean and maintain planes with them. Construction workers use them for multiple tasks and maintenance personnel find all types of uses for them around a building or factory. The list goes on.

For these reasons and many others, scissor lifts have become a requirement for any major rental company's fleet. The versatility means a wide variety of customers come in search of scissor lifts for many different tasks. The challenge for rental operations, then, is to make sure they select the best available scissor lift to fit these flexible needs. With so many manufacturers in the market place, having a clear understanding of the goals of end users is one of the most important considerations when selecting what scissor lift to stock.

Versatile User Needs Require High Uptime and Low Maintenance

Scissor lifts are used to fix things, install things, hang things, and just about any other task that involves overhead access. They replace rickety ladders and don't require climbing a mountain of stairs to reach overhead areas. Workers love them because they raise them to their work areas quicker and safer. And they can carry a lot of their tools with them too. Managers love them because they're more productive, they keep their workers safer, and they're available for rent, so they can be available whenever the need arises or even purchased if the usage becomes more frequent.

Today, scissor lifts are being used more and more by individual homeowners, shopping malls, special event promoters, and others because they're simple to operate and easy to move around. They have a familiar up/down control system due to their single-axis construction, they're versatile, and they take up very little floor space - a neat and tidy package.

As one of the leading MEWP manufacturers of aerial products in the Asian market, AICHI recently introduced a new line of completely re-designed electric slab scissor lifts in North America. The new AICHI E-Series scissor lifts are more compact, stronger and more reliable than many previous generation scissor lifts. And they feature an all-new AC drive system that is unlike any other drive system on the MEWP market. According to Alan

Dotts, Toyota Material Handling USA's Special Projects Sales Manager, "These new machines with their AC drive system were built to provide longer life and a maximum return on their owner's investment. Rental companies can expect to get years of reliable service for their money and operators will experience the latest in ergonomic comfort and ease of use."

Founded in 1962, AICHI became a subsidiary of Toyota Industries Corporation in 2003, and the new line is being distributed exclusively through the Toyota Material Handling dealer network. This assures consistent national sales and service support for the products throughout the United States and Canada.

AICHI E-Series scissor lifts were designed from the ground up to provide maximum run time so that operators were never faced with a "dead" machine or a machine that wouldn't work a full shift. AICHI also built in features to provide years of low maintenance so rental operators could keep their machines out on rent longer without service calls.

With a completely new design, AICHI was also able to integrate all of the latest safety features to keep operators safer and avoid unnecessary downtime.

"We were able to start from a blank canvas,' stated Trinton Castetter, Product Planning Specialist. "This allowed AICHI marketing, sales and others in management to evaluate where the market was, where it was headed, and what types of products were necessary to achieve increases in both safety and productivity, with an eye towards delivering the lowest total operating cost."

"We assessed the mechanical strengths and weaknesses of existing products on the market and compared the best features of the top-selling machines to incorporate the most popular into our new design," added Castetter.

Being a Toyota Industries company, AICHI engineers were also able to work with engineers from other Toyota companies where they were introduced to new technologies that had been proven in other fields. AICHI engineers were then able to incorporate these newest technologies into their new E-Series machines. They were also able to improve on many other older designs to make them better, stronger, safer, and in some cases, more operator friendly.

The result of all this work is that Toyota AICHI dealers are now able to offer five all-new electric scissor lift models that can match up spec-to-spec with any machines on the market. "Because it's available in

19-foot to 32-foot platform heights and 30-inch - to 46-inch platform widths, our new E-Series range of products should cover over 98% of the known applications for electric scissor lifts," stated Dotts, "This allows our dealers to get more rental out of their machines and our end user customers to get more uptime, every time," he added.

New AC Drive System Provides Longer Run Time, Lasts Longer

Since forklifts serve a similar function for materials as scissor lifts do for personnel (they lift things up to overhead areas), and Toyota has been the leader in the design and manufacture of forklifts for years, AICHI engineers thought that there were many field-proven systems that could be incorporated into their new designs.

"The biggest innovation that we 'borrowed' from Toyota is the power source for our new machines," said Castetter. "The drive system we incorporated into our new design was based around an AC direct drive motor similar to what Toyota has been using for years in the material handling field. The innovative system has been field-proven to outperform and outlast other material handling products in the field so it was natural for us to adopt this proven technology," he added.

AICHI's exclusive system includes an AC direct drive motor coupled to four, six volt 220 Amp-hour deep-cycle batteries that provide extended operating run time and greater efficiency. A Toyota-designed control with CAN/BUS technology oversees the overall system. This provides minimum of power loss and maximum energy at the drive wheels where you need it most.

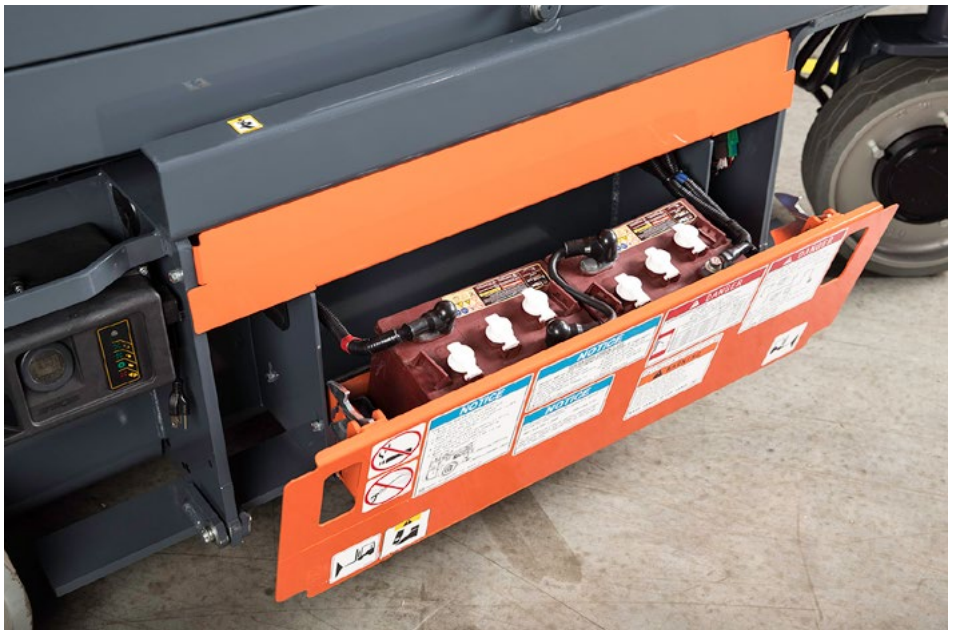
The AC drive motor is brushless so it lasts longer, and it requires less maintenance. Tests have also shown that it draws less amperage from the batteries than similar DC drive or electro/hydraulic systems. Low amp draw helps maintain the batteries as their depth of discharge is less. Battery service calls are reduced.

The AICHI AC Drive System has been proven to produce more than twice the operating hours of a hydraulic system. And according to results from industry standard “Hird Tests” (the test is a consistent method for testing the battery life of electric self propelled lifts through a cycle of functions that represented real life use) that were conducted by a leading trade publication, the AICHI machines also outperformed the competition with both faster cycle times and lower amperage draws from the batteries.

Re-Designed Scissor Arms Reduce Weight, Lower Center of Gravity, Permit Easier Access

An example of AICHI’s re-engineering can be found in the scissor arms on the narrow slab machines. Some 19-foot narrow slab scissor lifts on the market have four sets of arms or “stacks” to handle the lifting operation. AICHI engineers re-designed the arms on their new machine to make them slightly longer and stronger than on previous models. The result is that the AICHI Model SV1930E reduces the number of scissor stacks from four stacks to only three stacks yet still achieves the same lifting height.

Unlike some other scissor lifts with difficult to reach platforms, the platform on the AICHI SV1930E is now lower and easier to enter and exit when the machine is lowered. The steps on the ladder were also re-designed to provide more room for operators to easily find them, and they were made deep enough so they comfortably fit work shoes like steel toe boots so they don’t slip when entering the platform. An extra one-half inch between the platform and the top rail reduces the



amount that operators need to lean forward when entering or exiting the platform.

At the top of the entry ladder a chain-type closure is standard to keep workers in the platform. Also, self-closing door-type platform gates or vertical sliding gates can be ordered.

Having only three scissor stacks also reduces the overall weight in the SV1930E. Separate left and right bosses and split pins reduce weight even further. Reducing the overall weight permits the machine to be loaded in standard construction elevators and may also help in loading and unloading machines from delivery vehicles.

"Reducing to three scissor stacks on the narrow Model SV1930E, coupled with a switch to smaller, non-marking tires, helped us reduce the overall height of the machine when lowered so that it can pass through a standard doorway without folding the guardrails. This really helps when moving the machine around a building or factory," said Dotts.

Some companies require the guardrails to be lowered and folded before their scissors could pass through a standard doorway. Optional fold-down railings are available on the 19-foot model to lower height even further. Folding guardrails are standard on all other AICHI models and reduce overall height by almost 8 inches (200mm).

Improved Stability, Side-to-Side Sway Reduced

Since the AICHI E-Series scissor lifts were designed and built from the ground up, stability and rigidity could be built into the machines from the ground up also. Side-to-side sway is one of the operator's biggest complaints, and AICHI engineers knew they needed to make the machines more rigid to deliver more operator comfort in the platform. To help minimize sway, the cross members connecting the left and right members as well as the large cross-sectional area of the link pipes were strengthened.

To minimize swaying further, the topmost link pipe has a narrower cross-sectional area than the lower link pipe, and relocated link mounting positions improved longitudinal stability. Batteries are also mounted on right and left sides to improve lateral balance, and other components are re-arranged to provide better overall weight balance as well.

Three scissor stacks instead of four also helped reduce sway as they lower the center of gravity, and the larger machine footprint as a result of the longer scissor arms also increased stability.

The result of building this increased rigidity into the scissor frame, plus the better weight distribution in the base, and the low-profile small-diameter tires, makes the AICHI SV1930E one of the most stable narrow

slab scissor lifts on the market today. Stability means a great deal to the operators who use these machines, whether on occasion, or on a daily basis.

Safety is a Priority, New Design Incorporates Latest Features

Nothing is more important than operator safety, and safety is built into every E-Series machine. Entering the market, AICHI engineers were able look at other products in the field to see how they were built and what they were designing to make them safer. AICHI was then able to incorporate the best examples into their machines and adapt and improve on existing designs as well.

Standard safety features on the new AICHI scissors include an active pothole protection system with an extension detection limit sensor to assure proper movement of the device's rails. These systems are important because they prevent the machine from tipping over sideways if it is driven into a depression or pothole that causes a shift in the center of gravity. The lowered pothole protection rails also limit side-to-side swaying when the scissorlift is elevated.

With 25% gradeability, the machine is capable of safely going up most ramps when in the fully lowered position. An anti-rollback function keeps the lift in place if stopped on the incline. To prevent unintended movement when driving down a grade, a controlled descent feature automatically reduces the machine speed when traversing grades. All AICHI scissor lifts also come standard with a tilt alarm that limits drive and lift functions and sounds an alarm when the machine is out of level and a travel speed limiter that keeps travel speeds to a minimum when the platform is elevated.

After years of development and thorough testing, the new series of AICHI machines have been found to meet all existing ANSI Standards including the recently announced ANSI A92 Mobile Elevating Work Platform (MEWP) Design, Safe-Use, and Training Standards that will be published in Spring 2017. They are also in compliance with the current OSHA Standards for Scissor lifts, and they met or exceeded the standards of the CSA and all other National safety agencies.

Operator Controls Ergonomically Designed, Maintenance Intervals Reduced

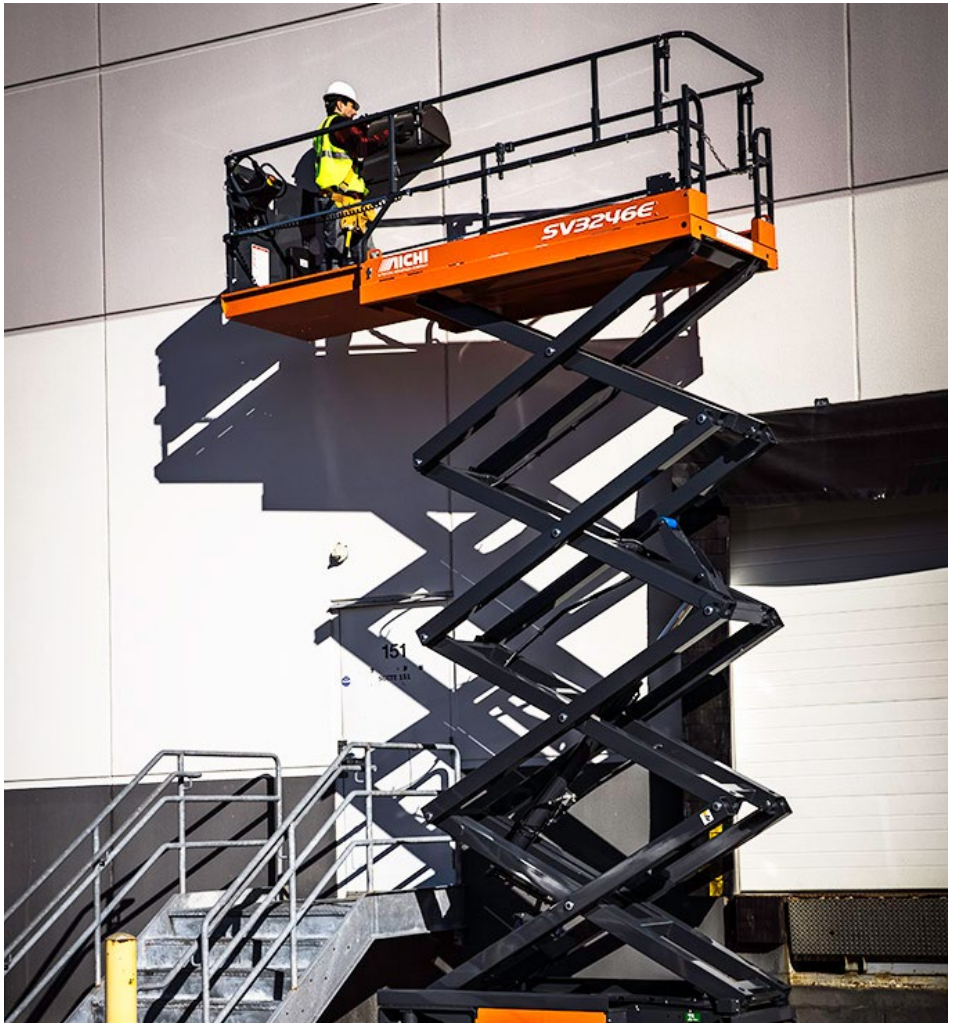
Standard Features on the AICHI machines are not only designed for increased cycle time and longer life, they are ergonomically designed to be easier and quicker to operate and maintain. All controls in the platform control station are at the operators' fingertips. The control box is angled so it faces the operator, and hooks on the back of the control allow it to be positioned on the left or right side for user preference.

Controls are simple to understand and easy to use. The lifts include a joystick with a steering switch mounted on top, a dual mode selector switch that allows increased platform capacity at lower heights for more flexible use, an emergency stop, and a standard battery indicator that keeps track of the amount of charge available. An additional battery charge indicator along with hour meter and error code display is located on the lower controls.

Engaging the large 35-1/2inch (900mm) long deck extension is easily accomplished by lifting the convenient handles located along the top railing, then sliding it out. This increases the platform area, or extends the platform out and over an object at the ground level.

There's no bending or stretching to check or replace batteries either. Batteries are mounted on trays that pullout, then tip out towards the operator so they can be easily maintained or replaced as needed. Hydraulic oil levels can be easily checked without the use of tools, and oil-free bushings in the scissor structure minimize required maintenance. A high-efficiency battery charger is also included as standard equipment. The lower amperage draw from the efficient AC motors, and the resulting lower depth of discharge from the batteries, keeps them in a fuller charge condition throughout the working day.

These machines were meant to last. Not only do they drive farther and last longer than other machines, AC electric drive systems also do away with the messy leaks associated with hydraulic drive systems. They even require less maintenance than DC drive system equivalents, keeping your maintenance costs down in the long run.



Productivity is Increased, Machines Last Longer

The last thing a rental operator needs is a service call for a machine out on rent, or a customer calling because their battery is dead on the job site. Service calls cost time and money for both end users and rental companies alike. So it makes sense to invest in products that will outperform others and provide longer service life. AICHI's new line of electric slab scissor lifts meets those criteria.

Ultimately, it is the overall value associated with low maintenance and greater usage time between charges that make the AICHI E-Series scissor lift one of the most reliable machines on the market for rental companies to stock in their fleet.

"Although the initial purchase price of AICHI electric slab scissorlifts utilizing AC Direct drive motor technology may be a little higher than other machines at first," added Dotts, "when you look at the track record of these AC drive systems in the material handling field, it seems well justified. They are robust and proven to last longer and outperform all other drive systems. Their introduction to the mobile elevating work platform industry brings a welcome new application for this proven technology."