BALANCING PERFORMANCE AND COST: HOW TO CONFIGURE FORKLIFTS

Capacity, environment, terrain, load, power, ergonomics—the list of characteristics that operations must consider when choosing forklifts is seemingly endless. In addition to these standard criteria, there is also a broad range of optional features and equipment and even special engineering that creates a spectrum of lift trucks that ranges from off-the-rack to custom-tailored.

Every operation and industry faces its own unique challenges, and many applications and conditions call for more customized configurations. But, regardless of the situation, overequipping a forklift wastes money up front on features that don't translate into business value. And, although underequipping the truck might cost less at the time of purchase, that savings can evaporate quickly in the form of reduced productivity, more downtime and costly, frequent repairs.

A properly equipped forklift can provide significant benefits to an operation in terms of productivity and total cost of ownership. But, to enjoy those benefits, operations must understand the pitfalls of over- and under-specifying, how to determine the degree of customization required for their industry and application, and how to craft a configuration that strikes a balance between upfront cost and long-term benefits.

MODES OF CUSTOMIZATION

- Standard as it comes
- Choosing from a menu of options
- Special engineering
- Aftermarket enhancements (tailoring it after you have it)

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UNDERSTANDING OVER- AND UNDER-SPEC'ING

Configuration needs vary widely depending on the type of lift truck and application. Although every operation should consider their unique needs — whether choosing options from a standardized list or custom-configuring a truck for a specific task — it is important to strike a balance between "too much" and "not enough."

Over-spec'ing a lift truck with features that aren't needed, first and foremost, makes for a higher upfront cost than necessary. Sometimes, those features are subtle ones that are baked into the basic design of the truck that most buyers don't think twice about. For example, some lift trucks incorporate features like a full lights package as standard equipment. It doesn't sound like much but, if the truck is always going to be used in well-lit areas indoors, or only during the day outdoors, the lights are unnecessary for that business. But their cost is folded into the price of the truck.

More obvious features that might exceed what operations need are performance related — and they're easy to spot by comparing the features to the requirements of the application and environment. For instance, if the truck is being operated in speed-limited areas and doesn't need to travel uphill with heavy loads, it is unlikely it requires an engine or motor that is more powerful than that of the standard model. If the truck is only operating for a few hours a day or performing light duty tasks, an investment in an upgraded transmission or an advanced braking system is probably unwarranted.

Apart from cost considerations, over-spec'ing lift trucks presents a number of practical concerns. Each feature — even if it does not get used — is a potential "opportunity" for additional maintenance or replacement over the life of the truck. If a feature is not justified by an application, its presence can also introduce unnecessary complexity, making the truck more difficult for operators to understand without additional training.

There are also definite disadvantages to under-spec'ing lift trucks. Lower-cost trucks that are equipped for occasional or light duty cycles tend not to stand up well to hard or intense operations. If the truck is struggling to perform the job at hand it slows down the operation, impacting productivity and key performance indicators (KPIs). An imbalance between the truck and the requirements of the job can also make breakdowns more likely, further undercutting productivity and increasing maintenance and repair costs.

A lower upfront cost is the biggest motivator when it comes to operations under-spec'ing. Salespeople may even feel pressure to close a sale by recommending low-priced equipment. But, if the truck will not survive the job it is expected to perform, it will need to be replaced sooner than a properly configured truck, leading to higher overall costs. Avoid under-spec'ing by making sure that the features and performance are up to the task at hand.

Bottom line: Operations should let their industry and applications dictate lift truck configuration. However, they shouldn't lose sight of the future. If there are plans to expand and grow, it can pay to slightly over-spec in anticipation of future needs.

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WHAT TO CONSIDER WHEN CONFIGURING A LIFT TRUCK

When configuring a lift truck there are a number of fundamental factors that must be weighed to help make it a good fit for the job.

1. **What load capacity is required?**
2. **Are attachments used?**
3. **How many hours per year will the forklift work?**
4. **How intense is the operation?**
5. **Where will the forklift be used?**
6. **What surface is the forklift used on?**

Load

It is best practice to start spec'ing the lift truck based on the loads it is expected to handle. Load determines many key parts of the truck's configuration.

Start by making a list of what loads need to be moved, their size, their weight and how high they must be lifted. Typically, the heaviest load and/or the load that needs to be lifted the highest should have the greatest influence on truck specification, but all loads should be considered. For some operations, this may mean choosing to over specify the forklift to add future flexibility. Of course, there are always tradeoffs. Higher-capacity lift trucks are typically larger, so maneuvering space must also be considered.

How high loads must be lifted also influences the specifications for the mast. Higher lift heights typically require more steel in the mast, which can reduce through-mast visibility and require operators to adjust their position more frequently to achieve proper sightlines. Load also dictates the carriage and hydraulic functions required, especially in applications where multiple pallets are lifted or when attachments are required to lift the loads.

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Hours in use

The age of a forklift is measured in hours rather than years, so the number of hours of expected use plays a significant role in lift truck configuration. It helps determine maintenance schedules, predict equipment lifespan and optimize performance for efficiency and safety. And, in the case of electric lift trucks, knowing how many hours a truck is in use each day helps determine the required battery capacity and charging schedule.

Many operations under- or overestimate the number of hours a forklift will be used, which leads to under- or over-spec'ing. Tracking truck data using telematics can be useful in helping operations determine how many hours lift trucks are actually in use. This data, in turn, can help operations make smarter choices during the configuration process.

Spend by component code

Serial number	Current MSM hours	Measured date	Usage hours in period
H118N05297U	1804	18-May-21 11:00	500.8
H118N05546U	1895	18-May-21 11:00	317.9
H118N05665U	1872	15-May-21 13:41	471.0
H118N05703U	1885	17-May-21 11:13	448.4
H118N05709U	1988	18-May-21 10:57	494.1
H118N05770U	1886	18-May-21 10:58	221.5
H118N05795U	1928	18-May-21 10:51	344.4

Environment

The environment in which the lift truck operates also figures heavily in the configuration process. Initially, the physical dimensions of the work area – the amount of distance the truck will regularly traverse, aisle widths, turning areas, doors and overhead obstructions must be considered.

One of the most obvious environmental factors is whether the truck is being used indoors or outdoors. Most of today's counterbalanced forklifts can operate inside or outside, but the exact configuration could change substantially. For example, options like enclosed cabins, heating and air conditioning are often desirable for outdoor operation.

Ambient temperature is a factor that is often overlooked. Consistently high or consistently low temperatures impact lift truck performance. This is a factor that is particularly important for operations used to internal combustion engine (ICE) powered trucks that are thinking of moving to electric. Low temperatures can significantly reduce battery capacity, so battery configuration may have to be upgraded even if the operating environment sees reduced temperatures for only a few days per year.

Another overlooked factor is altitude. At extreme altitudes, thin air affects the engine performance of ICE trucks, reducing their power. This means that electric forklifts could be a better fit for operations at high elevations.

Terrain is also a consideration. Indoors, surfaces are typically smooth, but expansion joints, ramps between areas and wet surfaces can all dictate changes to the truck specification to improve control. Outside surfaces are often variable, comprising everything from smooth tarmac, asphalt and concrete to dirt surfaces with potholes, gravel and railway tracks. These rougher surfaces are often drivers for additional features. For example, options that help reduce vibration transmitted to the operator are mandated by legislation in some markets. Work on grades and slopes can also influence configuration decisions, especially

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if loading is required on a grade. Features like hill hold can help operators improve productivity by reducing the need to ride the foot brake or balance the forklift on the throttle.

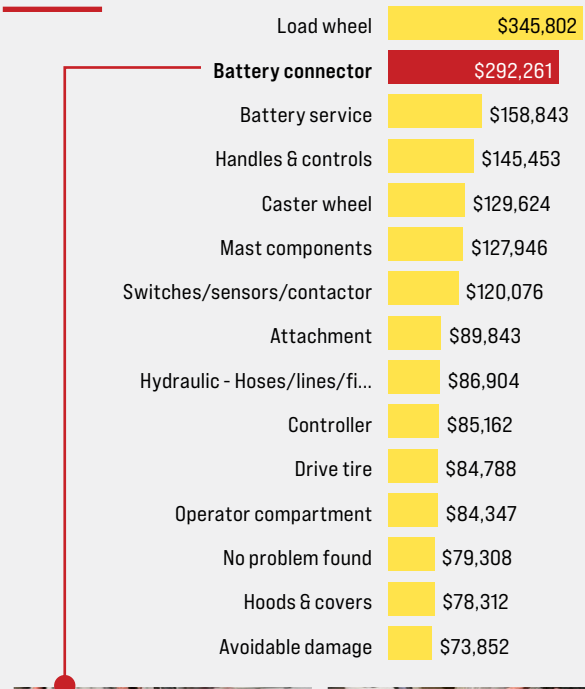
Power source

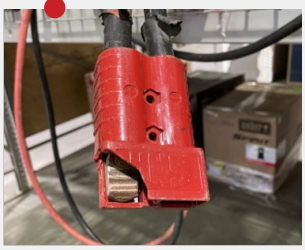
Decisions around power source are not only limited to the truck itself, especially when considering changing to a different power source. Questions arise about the need to add or change infrastructure and how to manage the switch across an entire fleet. This is particularly true for operations transitioning from ICE to electric. In situations where multiple forklifts are used, electrical infrastructure must be carefully considered to determine if it can handle the load of charging multiple forklifts. Often, with some minor changes to working pattens, no infrastructure changes are required. An electrification expert from a forklift dealer or manufacturer can perform an evaluation of your operation to determine whether electric trucks are a good fit.

Telemetry data

If available, telemetry data from an operation's current truck fleet can be invaluable to proper lift truck configuration. In addition to providing an accurate picture of how many hours trucks are in use, telemetry tracks maintenance and repair information. Operations can use this data to determine which systems and parts experience the most wear or damage in their application. This information, in turn, can be used to inform decisions for configuration choices that could potentially reduce part replacements and repairs. If the trucks in the operation's fleet aren't equipped with telemetry, dealers and manufacturers may be able to obtain some data, like hours of usage, from the trucks' warranty systems.

Spend by component code





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WHAT CONFIGURATION OPTIONS ARE AVAILABLE?

Basically speaking, the continuum of truck configuration runs the gamut from an off-the-rack standard truck that can be configured at the factory — with options chosen from a standardized list or custom-engineered for the customer — to options that are added after the truck is built and sold. Some manufacturers offer customization options across most if not all of their product line.

The breadth of available configuration options varies widely by manufacturer. Some manufacturers have a large variety of configuration options but a smaller line of trucks, making under- and overselling much more likely. Others have a broad line of trucks, each with a variety of standard features with a relatively small number of available options, which also limits configurability. Top manufacturers, on the other hand, offer both a broad line of trucks and options ranging from existing technologies and features to custom-engineered solutions, making it much easier for operations to craft a configuration that's a good fit.

Regardless of the level of customization, it is advantageous to choose a manufacturer that has both a wide range of options and the ability to custom-tailor options to meet operational needs if required. In addition to the advantages of being able to closely match the truck's build to specific applications, custom engineering tends to drive improvement across the manufacturer's entire product line. When the manufacturer recognizes a feature as being of value to one customer, it is often made available as a new option for customers — or even incorporated as a standard feature across their product line.

Common scalable features

1. **Powertrain & powertrain accessories**
   Air filters, radiator screens, exhaust options, auto shutdown options, etc.
2. **Start options**
   Keyed, keyless, telemetry access
3. **Front end**
   Mast type/height, carriage, forks, accumulators
4. **Hydraulics**
   Control type, number of functions, types of pumps
5. **Chassis**
   Direction control, display type, belly pan, tie downs
6. **Tires**
7. **Operator compartment**
   Overhead guard, enclosed cabin, seat, climate controls, accessories
8. **Operator assist features**
   stability control, enhanced productivity features, camera systems
9. **Lights and alarms**

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THE COST-BENEFIT ANALYSIS OF CUSTOMIZATION

Balancing upfront costs against potential long-term performance benefits and savings is a critical part of the purchase and customization process. Special solutions are often more expensive than the standard or off-the-shelf options, so consider both alternatives and the tradeoffs. For example, if adding a special option delivers a performance improvement that means one less piece of material handling equipment is required, the operation not only saves the cost of the additional forklift itself but also on the operator costs.

Ideally, operations should come into the configuration process with specific metrics or KPIs that they would like to meet. But, at the very least, they should have a clear, data-driven understanding of their application. For example, perhaps a business wants to move 300 1-ton loads per eight-hour shift. They could have one very busy truck—or, alternatively, they could invest in a double pallet handler and a truck with a higher load capacity to halve the number of journeys. That means spending more initially in terms of customization, but that additional cost is offset by a reduction in running costs over time. Another option might be to use lower cost trucks to move the pallets horizontally and then another truck to store vertically. In most situations there is usually more than one viable solution. Operations can benefit from working with a manufacturer or dealer that understands their business and can help guide the purchase and configuration process to deliver a best-fit solution.

CUSTOM CONFIGURATION IN ACTION

Configuring lift trucks to match requirements solves a variety of operational problems both small and large. Below are several examples of forklift purchasers who saved money by scaling back features that were not necessary for their operation or who realized value through strategic enhancements.

The right carriage for the job

One of the most widespread and well-documented features that can affect operational efficiency if not configured correctly is the carriage. On most lift trucks, the lowest cost option is to have a carriage where the forks are fixed in position relative to the mast. This works well in many situations, but it requires the operator to align the forks perfectly when picking up a load and then align the truck and the load perfectly when storing the load. This typically means that, if the operator is as little as 2 inches out of position, they must reposition the load and try again. This costs the operation time and increases movement, resulting in higher operational costs. When the same forklift is configured with a side shifting carriage, the 2-inch misalignment can be adjusted by the operator without having to reposition the truck, saving the operation time and money.

Some operations use a variety of pallet sizes. Even with the side shifting carriage, every time the operator picks up a load with different fork pocket spacing, they need to get off the truck and manually reposition the forks. By equipping the truck with a side shifting fork positioner, where the operator can reposition the forks from the cab, operator productivity is greatly increased. In an industry that moves large volumes of pallets of varying sizes, the operational savings can far exceed the initial cost of the modification.

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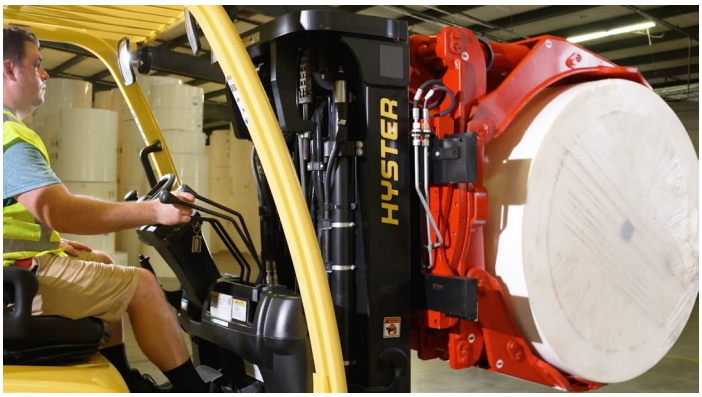
Configuring for specialized environments

The paper recycling industry typically uses lift trucks to load and unload bales of used paper into or out of containers. This application requires high productivity in an environment that is typically covered in small pieces of paper and debris that be sucked into the truck's cooling system, creating a risk of blocked radiators and engine damage. It can even lead to trucks becoming inoperable due to lack of cooling and built-up debris in the engine bay can increase the risk of fire.

One operation facing this challenge worked with their manufacturer to incorporate a custom engineered cooling system with a hydraulically controlled reversable cooling fan that blows debris away from the radiator and out of the engine bay. This solution increased cooling capacity and reduced the chance of debris build up. Combined with protective exhaust wraps, it minimizes the chance of debris contacting hot surfaces and therefore reduces the risk of fire. This custom solution was so successful that it was added as standard option to some of the manufacturer's lift truck models.



The right tire makes all the difference

Tire choice can really move the needle in terms of total cost of ownership. An operation with a heavy workload – for example, two shifts a day, averaging 2,000 hours per year per forklift – should consider upgrading to premium tires. This reduces the rate at which the tires wear and, ultimately, reduces the number of times they need to be replaced over the lifetime of the truck. The choice results in savings on tires and reduces downtime associated with tire changes.

Conversely, a low-intensity operation that is only putting about 500 hours per year on their trucks should generally stick with standard tires. Here, the higher wear rate is typically not an issue due to the lower hours, and both the initial cost and total cost of ownership is reduced by choosing the right option for the application. Telemetry data that provides accurate information on the number of hours trucks are in use can provide operations with the information they need to make an informed choice on which tire type is best suited for their application.

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CONFIGURING THE RIGHT TRUCK FOR YOUR OPERATION

With all the configuration options available, avoiding over- or under-spec'ing lift trucks should always come back to an analysis of what the job and environment require balanced against the monetary considerations of up-front cost, impact on productivity and cost over time.

A good lift truck provider will always start by gaining a thorough understanding of an operation's application and, as a starting point will—if possible—suggest a standard solution to meet their needs, typically saving time and money. For applications that require special options, working with a manufacturer that has a dedicated special engineering team is important to achieving the right level of customization. These experts can tap into specialized knowledge and experience gained from other customers with similar applications to develop a lift truck that is equipped to best fit the application at hand. Plus, the benefit of working with a manufacturer with a specialized engineering team is that operations get the same factory-backed support for a custom-configured trucks as they get for an off-the-rack version, including the relevant legislative compliance required for the truck.

Hyster has the industry and engineering expertise to help guide you in the configuration of a lift truck that is well-suited to your segment and application. To learn more, contact your local Hyster® dealer or visit Hyster.com.

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