

Load charts, identification plates, and load capacity plates: Whatever you call them, they are the least looked at and least understood item on a forklift. An operator will check the engine oil before consulting a load chart. If load charts were looked at, consulted or followed, I believe operators and managers would be surprised at what they find.

For example, in the industrial fork truck industry there is a little-known secret usually only exposed in detailed forklift training. The secret is that the forklift you are operating probably has a designation or name used in sales literature that is not what the forklift actually does.

Let me explain. One of the most widely used, sold and rented warehouse-style forklifts is rented as, sold as and called a "5,000-pound forklift." This 5,000-pound forklift typically is equipped with a three-stage straight mast, usually about a 15-foot lifting height with a side-shift feature. If you consult the load chart or I.D. plate for this forklift, which few operators understand, you will see that this lift may only be rated to pick up 3,700 pounds. That's right, 3,700 pounds.

I have another secret. If that 5,000-pound warehouse forklift you bought or rented has a four-stage mast often called a "quad mast" with about 20 feet of lifting height with side-shift that 5,000-pound forklift may only be rated to pick up 600 pounds. No, that is not a typo. SIX HUNDRED POUNDS!

How can this be? The advertised 5,000-pound forklift you bought or rented is only rated to pick up 5,000 pounds with a single-stage mast typically 5 feet high without the side-shift option. There are not many of those sold or used. Let me explain the engineering problem first and save the secret problem for later.

Engineering

Forklifts are, very simply, "levers." They are designed per an ASME/ANSI standard to pick up a 48-inch by 48-inch by 48-inch cube of weight with an evenly distributed load and 24-inch load center out from the rear of the forks and 24 inches up from the forks. Levers need a fulcrum point, which is the front axle line on the forklift and force to lift the load. The force is a combination of hydraulic pressure and counterweight. The hydraulic pressure lifts the mast sections and the forks with the load to be lifted and the counterweight at the rear of the forklift counteracts or balances out the load being lifted. The further the counterweight is from the fulcrum point, the more weight that can be lifted or the less counterweight you need. If you have enough counterweight and the distance is far enough from the fulcrum point and you have enough hydraulic pressure, you can lift a predetermined load. It is not my intention in this article to get into the formulas used to determine how this all works.

The problem with a straight-mast forklift is mast tilt. (See illustrated examples.) That is usually the middle lever to the right of the steering wheel. When you tilt the mast forward to deposit the load, the operation impacts the lever. It moves the load or weight away from the fulcrum point, lengthening the lever's distance from the fulcrum point to the load. This reduces the capacity of the forklift to lift.

Remember the old seesaw or teeter-totter on which you used to play? If two children of equal weight get onto a seesaw, the areas where they are supposed to sit are balanced and the fun begins. If one of those children moves towards the fulcrum point, that child will go up and the other child, still sitting on the end, will go down. If you remember playing on the seesaw, it probably did not take you long to figure out that if you wanted to take your seesaw partner for a ride, you tried to sit as far back on the seat as possible to be able to lever and bounce your partner up into the air.

Therein lies the problem with mast tilt. The taller the mast, the more the mast can tilt forward and arc the load away from the fulcrum point. The load tries to tip the forklift and if it succeeds, the forklift tips over. Without consulting and understanding the load chart, you may be able to pick up 5,000 pounds with that three-stage mast forklift with the side-shift option, but if you raise it all the way up and tilt the mast all the way forward, fasten your seatbelt, baby, you're going for a ride.

Disclaimer

I have to say a couple of things at this point to keep all the legal types happy. This is the part where you hear the fast-talking guy say at the end of the commercial something about MSRP, interest rates, down payments, lease payments, due at signing, etc..

- First, always consult the load chart and I.D. plate on the machine you are operating. These load charts and I.D. plates are required on all forklifts and must identify the make, model, serial number and lifting capacities in all ranges and any attachments such as longer forks. Without a load chart or I.D. plate, you cannot determine the

forklift's capacity and cannot use the forklift. This is part of your pre-start check.

- Second, the load chart/I.D. plate is the only thing you can or need to consult about the lifting capacity of the forklift you are operating. Operating manuals, literature, another forklift just like this one, what the salesman said and your boss saying, "Try and see if it will lift it" are not your source for lifting capacities. Load charts/I.D. plates must identify all forks (lengths) used and all attachments such as the side-shift option. Load charts/I.D. plates must communicate the lifting height, load centers and lifting capacities in all ranges or distances. Operators must have a full understanding of the load chart on the forklift they are operating. If they don't understand the load chart they haven't been trained or haven't been trained properly.
- Third, you have to know the weight of what you are lifting and the load center of what you are lifting.
- Fourth, get training.
- Fifth, all examples, drawings and illustrations used in this article are examples only, and in no way represent a particular brand, make or model of forklift or fork truck.

Not a Unique Problem

This problem is not unique to warehouse forklifts. Rough-terrain straight masts deal with the same laws of physics as well as reach, telescopic, shooting-boom forklifts. The same problem exists with understanding the load chart, only more so. Now, the load chart shows the distance or range out in front of and over the machine, a concept that many forklift operators have difficulty grasping.

So, you call your local rental yard and tell the person answering the phone you need a rough-terrain forklift that can lift 6,000 pounds. The person answering the phone tells you he has just the lift and sends out a 6,000-pound, reach, telescopic, shooting-boom forklift that can reach 36 feet. Perfect? Maybe, maybe not.

If you can pick up the load without extending the boom and you can lift it and put the forklift right up against the place you are landing the load, it will probably work. But how many times can you do that on a construction site? Because you can boom forward away from the forklift's fulcrum point, the capacity dramatically goes down. On many 6,000-pound, 36-foot reach forklifts at full extension in front of the tires, the capacity may only be 1,500 pounds. You say you couldn't even lift a cube of concrete block with that? Don't forget the above scenario assumes that the lift is perfect, the load is evenly distributed and balanced on the forks and the load center or center of gravity of the load is 24 inches from the rear of the forks and 24 inches up from the forks.

The Way We've Always Done It

In talking with some of the industry's largest forklift sales and marketing people, and consulting literature and Web sites, I've found one thing that seems to lead to a common theme about this secret. That is, "This is the way we've always done it." "We've always classified a forklift's model or name by what the maximum lifting capacity is and not by the many different ways it can be ordered, built and accessorized." This leaves the secret up to trainers like me to explain that the forklift you bought or rented cannot pick up a load of the size indicated in the literature.

Now, in all fairness, there are some forklift companies out there that are helping us out a little. Some companies are more detailed on their load charts. For instance, I've seen some that explain that the forklift that is sold as a 5,000-pound warehouse forklift with a 15-foot mast and the side-shift option can lift, for example, 4,800 pounds from 0 feet up to 5 feet, then 4,000 pounds up to 10 feet, then 3,700 pounds up to full height of 15 feet.

Some even use graphics to show this like the reach, telescopic, shooting-boom forklifts do. My hat is off to you guys; I like that. (Note: the side-shift option takes away from the maximum capacity of the forklift because the mechanism weighs 150 or so pounds and because the load can be shifted sideways away from the center of gravity.)

Other forklift companies are rating their forklifts "worst-case scenario." Yes, they might tell you that the 5,000 pound forklift will pick up 5,000 pounds, but they claim they cannot rate it that way because if you do pick up that much weight and you raised the mast all the way up to the fullest height and then tilted the mast forward, the machine would tip over forward, so they do not want to tell you that you can lift the larger weight.

The bottom line is this: Consult and understand the load chart and I.D plate for the forklift you are operating or buying and never exceed those limits.

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