



Barrels are positioned in two-barrel racks with heads facing the forklift aisle. It is a common storage method, but not the most space efficient.

# Rethinking Barrel Cellar Layout

A barrel-aging facility owner explains how to reorganize stacks for efficiency and seismic safety

By Mike Blom

Editor's note: Mike Blom, the owner of Napa Barrel Care in Napa, Calif., wrote the following article based on his presentation earlier this year at the Wines & Vines Oak Conference. Barrels and racks in Napa Barrel Care, an aging and bottling solution for virtual and brick-and-mortar wineries, suffered significant damage during the August 2014 earthquake, and prompted Blom to reconsider how he managed the thousands of barrels in his facility.

I am asked frequently what changes we made at Napa Barrel Care as a result of the August 2014 Napa earthquake. One of the most significant changes we made was the orientation of the barrels relative to the forklift-access aisle. The goal of this article is to lay out why the changes were made and what benefits your cellar might derive from reviewing how you use your space.

In order to look at various ways to lay out a barrel cellar, we made a number of assumptions for illustrative purposes. You can change the assumptions to meet your particular needs.

## Assumptions:

- 50-foot by 100-foot space (5,000 square feet)
- 14-foot forklift aisle
- Barrels kept 1 foot from walls for earthquake safety
- No support column interference
- Stokes rolling ladders for barrel access
- Experienced forklift drivers
- Loads being carried are within forklift operating parameters.

## Two-barrel rack: barrel head facing forklift aisle

Stacking barrels using two-barrel racks with the heads facing the forklift aisle is one of the most common stacking methods in the wine industry. There is some variance from cooper to cooper on the size of the barrels, but for this section's analysis we are using barrels that are 38 inches by 58 inches, head length by bilge width, when placed on a two-barrel rack.

Forklifting racks with the barrel heads facing the aisle is relatively easy. Insertion of the forks into the barrel rack is clearly visible and, depending upon fork length, can be accomplished without damaging the barrels behind the stack being built. If using the barrel heads facing the aisle, it is a good idea to mark your forks so that drivers know how far they can insert their forks into the racks without damaging the barrels behind but ensure there is sufficient contact with the forks so minor movements won't cause them to lose the barrel rack. Generally providing 2 to 3 inches distance between heads is a good idea. This space

gives the forklift driver some margin for error and minimizes the chances of having a fork clip an opposing barrel.

You can see the layout graphically represented in the illustration on page 62. The advantages to this layout are that it is simple to replicate, bung hole access for samples or additions is easy, and most forklift drivers grasp the concept quickly. Barrel sizes still need to be matched on each rack to keep the stack from tilting awkwardly.

The disadvantage is that this method is not the most space efficient.

## Two-barrel rack: barrel bilge facing forklift aisle

Stacking barrels using two-barrel racks with the bilge facing the forklift aisle is what Napa Barrel Care changed to after the 2014 earthquake. This layout is not uncommon in the

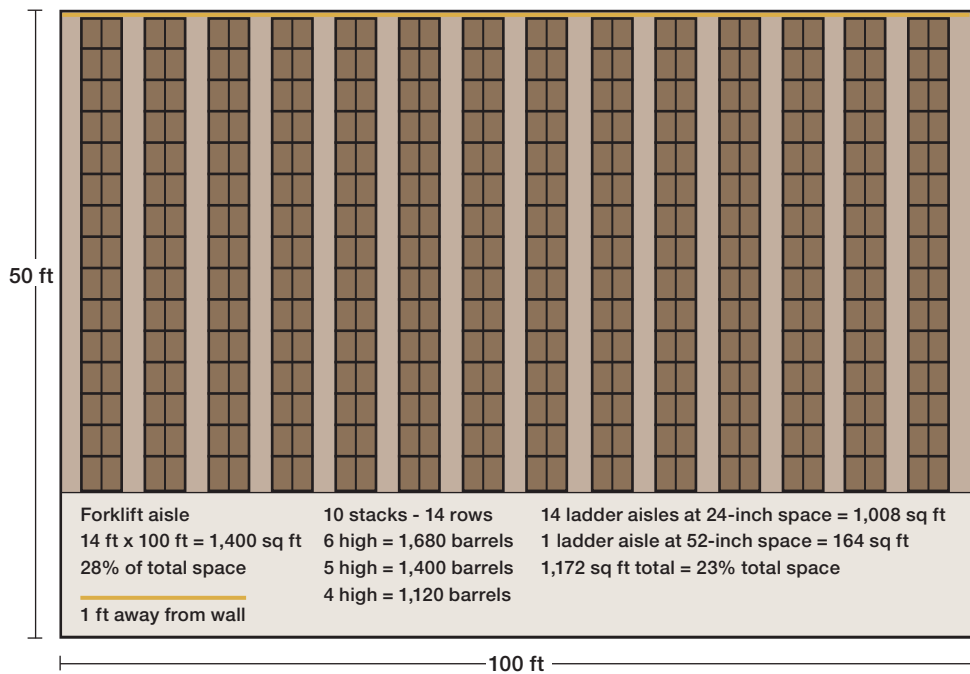
## KEY POINTS

The author explains how his company, Napa Barrel Care, reorganized its barrel cellar for greater efficiency and safety after many of its stacks collapsed during the 2014 Napa earthquake.

Changing barrel orientation so the bilges face the forklift aisle was one key element.

Strapping down the highest barrels, converting to four-barrel racks and adopting other safety measures are also discussed.

## OAK BARRELS



Barrels are placed on two-barrel racks with their heads facing the aisle.

industry but takes a little more skill with a forklift. This section's analysis uses the same size assumption for barrels: 38 inches by 58 inches, head length by bilge width, when placed on a two-barrel rack.

Forklifting racks with the barrel bilge facing the aisle is slightly more difficult. I recommend that the two-barrel racks be of a double-bar construction to provide the most strength to the rack. Insertion of the forks into the barrel

rack becomes a little trickier as we target getting the forks in between the double bars.

You can lay your forks completely flat to the floor and approach the rack so the forks pick up the rack from the bottom. In our case, we can receive a mixed rack where one barrel is empty and the other is full. If the empty barrel is not marked clearly, then the rack will want to shift to the full barrel, and having the forks in between the double bar can occasionally save us from dropping the rack in that case.

Because the forklift is grabbing the load by the widest portion of the barrels, the forks need to insert until the barrels touch the load back-rest of the forklift. You should confirm, before changing from head facing to bilge facing, that your forks have adequate length to support the barrel racks.

You can see the layout graphically represented in the illustration on page 63. The main difference as compared with heads facing the forklift aisle is that some of the ladder space has been eliminated. This gives a 10% capacity advantage in the same space using the same stacking height. If you stack only as high as needed to utilize your space, the capacity increase may allow your cellar to reduce how high you stack your barrels for a more seismically stable layout.

There are additional advantages to this

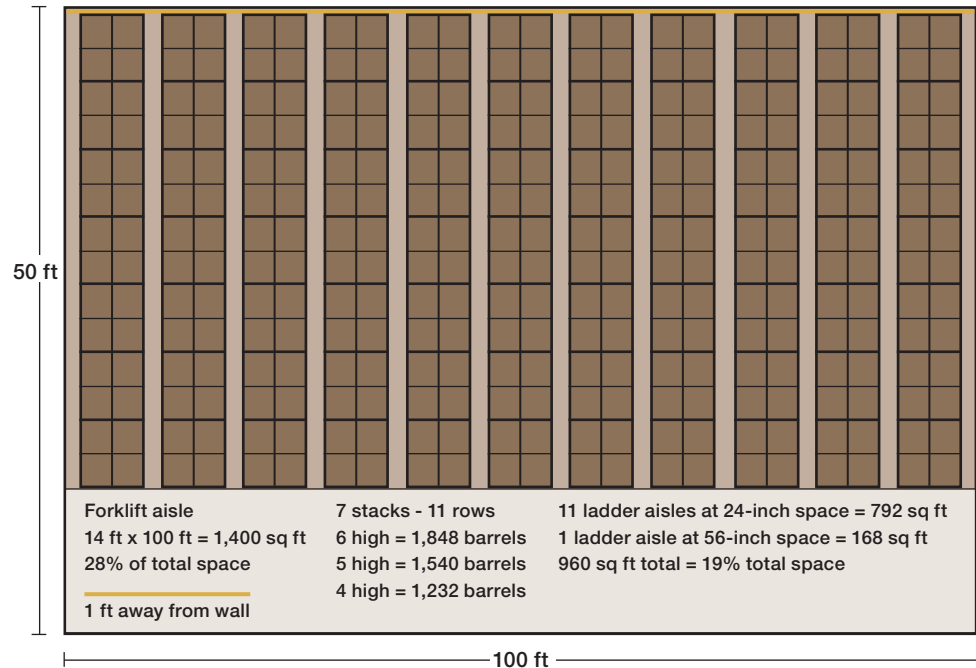
layout. Barrel head inventory tags are easy to see, or scan if you use that type of tracking system. It is still possible to sample and make additions in place. This layout can be converted to a four-barrel rack system easily.

Mixing both Burgundy and Bordeaux barrels in the same aisle will require the forklift driver to accommodate the longest barrel in order to keep the stack straight. Care must be taken on the side where the heads face each other to allow sufficient margin of error, as it is easy for one barrel to contact another when filling or emptying the barrel row. Barrel sizes still need to be matched on each rack to keep the stack from tilting awkwardly.

Other changes can impact capacity. Stacking the barrels using the longer room length would result in more efficiency. Anecdotal data seems to suggest the longer the barrel row, the more frequently the barrel farthest away will leak. Eliminating ladder aisles completely will increase your capacity but also increase your dependence on forklifts for sampling and making additions.

### Four-barrel racks

If you use the bilge facing the forklift aisle for four-barrel racks, then other considerations come into play. Obviously, having four barrels per single rack is heavier. You will



Some ladder space is eliminated in the bilge-facing layout for two-barrel racks, increasing capacity by 10%.

need to spread your forks as far apart as possible when picking up the full four-barrel racks. I recommend transporting full four-barrel racks by the bilge as the load center is closer to the forklift, however there may

be some instances where you will need to move the four-barrel racks lengthwise. We use fork extensions to provide fork support throughout the length of the barrel rack when needing to move four-barrel racks.



Strapping the highest racks in a barrel stack can prevent swaying during an earthquake.

You will need more room to maneuver when using four-barrel racks. The assumption of 14 feet aisle spacing should still be sufficient to move in and out of the barrel row, but other obstacles in your cellar (equipment, support columns, etc.) may hinder

movement. If carrying eight barrels at a time—or any time your driver’s vision is impaired—your forklift drivers should be moving the barrels in reverse to have a clear vision of where they are going.

### Other options

Of course there are other rack types available. Some cellars use Barrel Safe, or what I call “four-poster racks.” These racks stack upon each other rather than using the barrels as structural components of the barrel stack. Four posts rise above the barrel, and the next rack has receiving pockets to nest onto. These racks are larger as they need to be wider than the bilge of the barrel and as such take up more room. If you still want ladder space between the racks, you will need either a different style of rolling ladder than the Stokes rolling ladder used in the assumptions or to increase your ladder aisle width to accommodate the wider base of the Stokes ladder.

Other rack systems can be more permanent in structure so that once put into place, moving them and the barrels contained therein may not be practical or would require special forklift attachments to move the barrels in and out of the racking system. Access to the barrels and required space for such a setup would need to be taken into account.

The racks you choose have a direct impact on your cellar layout. Changes to your current barrel-storage system, either in layout or type, can have positive results in efficiency and/or safety. Just be mindful that any change you make needs to be thought through to ensure your equipment can handle the changes safely.

You should have your forklift supplier evaluate your equipment to ensure the load being lifted fits within the safety parameters of the forklift. The last thing you ever want is to be safe at ground level but then tip the forklift as you lift the load higher. Regardless of whether you use two-barrel racks, four-barrel racks, puncheons, totes, porta tanks or other equipment, you must be sure your forklift’s capacity is sufficient to handle the load before trying to move it! 🚛

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Mike Blom has more than 35 years of experience in the wine industry, with a career including time at Grigch Hills Estate, Santa Ynez Valley Winery, Firestone Winery and Firestone Walker Brewing Co. He was named general manager for Golden State Vintners’ Edgewood Estate in 2000, and in 2004 he became the consulting winemaker for Madorom Vineyards, a small boutique producer on the Silverado Trail, which he continues consulting for today. In 2005 Blom started Napa Barrel Care, an aging and bottling solution for virtual and brick-and-mortar wineries.