Get Accurate Stockpile Volumes with Drone Surveying

Measuring stockpile volumes is the number-one drone use case on any worksite. This is true for good reason. Drones have completely revamped this common workflow. Everybody—mines, quarries, and construction sites—needs to know the volumes of their stockpiles.

It doesn’t matter if those piles are fill dirt ready to level off a housing development or a grade ready to be blended and go into a mill or product ready for sale, good inventory and stockpile management is essential. And up until recently, doing so was one of the biggest challenges in the industry. Drones have changed that.

Why use drone photogrammetry to measure stockpiles?

The short answer is because it’s faster and less costly than traditional surveying, but just as accurate. This is due to a number of factors. Let’s break them down.

Faster stockpile surveys

Drones also cut down surveying time significantly, you can survey stockyard very quickly, in
just a couple hours or less. This is because the set up time and operation for drone surveying is virtually nonexistent. You just set out your ground control, set up the drone, tell it what area you want it to fly in an auto-flying app, and hit go.

When it comes to data processing, when using Propeller you’d just load up your data into the platform right in your browser and 24 hours later (or sooner) you get an email notifying you that your data’s ready.

**Accuracy of stockpile volume measurement with drones**

Ideally, a stockpile would be something with an easy volume to calculate, like a perfect cube or cone. But even in good cases, stockpiles are an irregular shape. What makes drone mapping different is that it can capture all those irregularities and faithfully render them in your survey, thus allowing the computer to calculate the volume of the true shape, not a rough approximation.

This accuracy starts with the imagery. Unsurprisingly, drone photos capture significantly more detail than shooting points with a rover. Photos let you see the physical details between the individual points a surveyor shoots when they’re walking a pile.

When you fly your stockyard with a drone, it’s capturing hundreds of images (or more), with lots of overlap, in order to reconstruct them into a 3D survey. The technical “how” of creating 3D surveys lies with photogrammetry methods and good ground control.

Both horizontally and vertically (Z values), drones are able to capture and render higher resolution data, that’s just as accurate as traditional surveying. And, the better your data is,
the better your model. Correctly used, drones in conjunction with ground control can produce 3D surveys with 20–50mm accuracy.

**How to measure stockpile volumes with drone survey data**

There are different types of stockpiles—from ramp- to bin-style to regular—and you want to measure them accordingly. Here are few examples of the different ways you can measure volumes in the Propeller Platform.

- Measure volume from a reference level. Set the baseline to a desired figure and get your total volume from there up.

  ![Diagram of a stockpile with a reference level](image)

- Measure using a smart volume, and let the computer do the work. For a smart volume, the platform is extrapolating where the base of your pile is and giving you a total volume from there.
• Compare volumes between two surfaces. This could be survey to survey in order to see change and progress over time, or measure against a design surface to see how far you have left to go.

And because these volumes are accurate, you can enter in a known material density into the calculator to get the tonnage for any stockpile.
Want to see our stockpile volume tools in action?

Check out a video demo for your industry.

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Theory and Practice of Stockpile Volume Calculations Using Drone Data

Beyond Stockpiles: What Else You Can Measure With Drones and Propeller’s Volumetric Tools

Six Smart Ways Mining and Aggregates Businesses are Using Drones