

## 3D printing technology could address the worldwide shortage of breathing apparatus

Gerrit Coetzee, a design engineer in San Francisco, therefore went on the Hackaday technology blog to call designers and engineers to create an open source print of a ventilator, which he described as a decisive device. There is a critical need for the life and death of Covid-19 patients but is in shortage.

As more and more Covid-19 patients are hospitalized, limited resources at health facilities are under great pressure. That is why flattening the curve is a very important strategy.

Radical isolation measures, combined with the practice of keeping social distance, will prevent a sudden surge of patient floods, overloading the hospital system and causing more deaths.

This was really happening in Italy, when they took measures to deal with Covid-19 too slowly. As a result, the hospitals in the north of the country were blown up, they had no beds, no more equipment. More than 2,100 Covid-19 patients in Italy have died out of nearly 28,000.

In response to this serious situation, a medical device manufacturing company in Italy came up with a breakthrough idea. They have assembled a 3D printing line to mass produce valves for artificial ventilators - an extremely important medical device to support patients with respiratory failure following Covid-19.





The story begins from a weekend Friday. Nunzia Vallini, an Italian journalist working at the local newspaper Giornale di Brescia, called Massimo Temporelli, founder of FabLab digital production laboratory.

Vallini explained to Temporelli the news she received. A hospital in Chiari - a small town near the capital of Rome has all valves installed in emergency resuscitation equipment, also known as a respiratory machine to help patients hold their breath.

The company that supplied these valves was unable to produce and immediately responded to the supply when the number of Covid-19 patients hospitalized increased sharply. Patients with severe respiratory failure are simply dying.

After Temporelli heard the story, he turned to Cristian Fracassi, founder and CEO of engineering company Isinnova to request a solution. Fracassi then contacted Michele Faini, a 3D printing specialist and R&D designer at Lonati SpA, a manufacturing company in Brescia.

The two had previously worked together and they worked together to design valves to help mix oxygen with air, an important component in a respirator.

The difficulty lies in the fact that the equipment supplier for Chiari Hospital did not agree to share the design parameters of the valve, even in an emergency, Faini said. But he thought that he could completely redesign it himself

Although this is the first time Lonati SpA 3D printing a product for the medical industry, but Faini said their 3D SLS system can create products with PA12 ink, a material that can be disinfected and used. For biomedical purposes.

"In just a few hours, we were ready to print these breathing valves. And one day later, we had 100 finished valves," Faini said. Fracassi also brought a 3D printer to the hospital and printed directly some valves there.



Currently, patients with Covid-19 at Chiari Hospital are able to breathe thanks to these 3D printed valves. However, as the pandemic spreads, other hospitals may also be at risk of similar deficiencies.

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3D printing has previously been used in the medical field for almost everything, from creating prosthetic devices to personalized surgical tools and drugs. In the present context, 3D printing can be the key to universal breathing apparatus anywhere in the world, as long as they have printers available.

What engineers need to think about now is how to work together, designing a print that can be shared widely. Such an open source design will help humankind in this time of disease.

Fiani noted that cooperation is a very important factor that helped him create breathing valves. They know that they must act quickly, because people can die without a ventilator.

"I hope that everyone understands that we must work together to stop this pandemic," Fiani said. "We all have to protect ourselves and must use the skills we have to help [those] who need them."

Refer to *Fastcompany*

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