

CASE STUDY

Sustaining PSA functionality by quick onsite handholding support and effective vendor coordination

A case of SCB Medical College and Hospital at Cuttack in Odisha, India



The 3000-bedded Srirama Chandra Bhanja Medical College and Hospital at Cuttack in Odisha, India

Odisha confirmed its first case of COVID-19 pandemic in mid-March 2020. Since then, the state has so far witnessed three waves of the pandemic. The second wave, which spanned five months from April to August 2021 in the state, was three times the most severe of the three, with about 11,600 new cases reported every day in the middle of May 2021. As some steel majors in the state, like the Tatas and Jindals, converted the industrial oxygen into medical grade oxygen on recommendations of the Odisha government to respond to the pandemic, the state government did not face shortage of medical oxygen.

Notwithstanding the surplus situation, the state government initiated the process of expanding and diversifying its oxygen sources. In addition to setting up LMO units and oxygen concentrators at the public health facilities, the Odisha government installed Pressure Swing

Ministry of Railway. In addition, the state government mobilized 30 PSA oxygen plants through Corporate Social Responsibility (CSR) resources. One of the approved sites was the 3,000-bedded Srirama Chandra Bhanja (SCB) Medical College and Hospital in the Cuttack district.

USAID NISHTHA's technical assistance

The United States Agency for International Development (USAID) Project NISHTHA extended a grant to PATH to provide technical assistance for faster operationalization of PSA oxygen plants in six states of India, namely, Delhi, Jharkhand, Odisha, Rajasthan, Karnataka, and Maharashtra, and for procurement and deployment of oxygen concentrators in four of those six states, i.e., Chhattisgarh, Delhi, Jharkhand, and Maharashtra.

PATH, as the Technical Support Unit (TSU) for oxygen to the Odisha government, provided technical assistance for installation and commissioning PSA plants through PM CARES in the identified health facilities and extended post-installation support.

PSA Plant in SCB Medical College and Hospital

The SCB Medical College and Hospital, the largest hospital in the state, handled around 1,500 out-patient department (OPD) cases and around 2,200 in-patient department (IPD) cases every day during the second wave. The teaching hospital has 182 ICU beds and 443 oxygen beds for patients.

The facility already had a 13 KL capacity of LMO plant installed in addition to 2,000 B-type cylinders, 2,800 D-type cylinders and an approximately 443 oxygen concentrators to support patients requiring oxygen support during second wave (Source: Odisha State Medical Corporation Limited). As the facility had established four COVID-19 units within its premises, the state government decided to install two PSA plants – one of 2,000 LPM capacity through PM CARES Fund and another of 600 LPM capacity with state CSR support – to cater to the need.

PATH, through the USAID NISHTHA project, assisted SCB Medical College and Hospital in getting the 2,000 LPM PSA and 600 LPM PSA oxygen plants installed. It supported the hospital management to coordinate with various stakeholders, like PSA plant vendors, district level engineers, the state nodal officers from the Health and Industry department, among others to ensure timely installation of the PSA oxygen plant in the medical college. Once the plant was installed, PATH further supported the hospital authorities in getting a sample of oxygen generated by the plants tested for quality by providing financial assistance and coordination for the sample collection, and certification. The certification allowed the SCB Medical College and Hospital to commission of the PSA plant for use. These two PSA plants supply oxygen round-the-clock to the 173 ventilators.

PATH also helped the hospital negotiate a one-year service warranty with the vendor. The hospital authorities placed two technical personnel from its roster, who were oriented by the vendor on daily maintenance and upkeep

of the PSA plants, for post-installation management of the two plants.

Hospital dials in PATH as oxygen purity drops

On 13 August 2021, the Hospital Superintendent of the SCB Medical College and Hospital called up PATH's team to inform that the 600 LPM PSA plant was not working efficiently, and its oxygen saturation level was falling rapidly, among other issues. As neither of their technicians were available around that time and the hospital administrators and the plant operators were not confident about handling the issue by themselves. PATH Odisha team sent its Technical Assistant Engineer to the SCB Medical College and Hospital to identify the problems and resolve them. PATH's engineer inspected the PSA oxygen plant and checked it for filter clogging, calibration, valves, and compressor. He also calibrated the analyzer to check whether it is showing right concentration on display or not. PATH's engineer found that the discharge valve between the adsorption column was not working properly, due to which nitrogen, which should be released from the discharge valve, is not getting released properly. This was causing the concentration of oxygen to fall below the permissible limit to 40-50 per cent at the output.

PATH's engineer called up the vendor's service engineer for assistance. This was required because as per the terms of reference in warranty document provided by the vendor any unauthorized troubleshooting or fixes are restricted. The service engineer agreed to inspect the plant and addressed the issues.

The service engineer replaced the valves. After replacing the valves, the oxygen concentration levels were checked every few hours until the saturation level once again reached above 90 per cent levels.

“As the PSA plant was not working properly, we were facing problems in serving the patients. It became even more difficult as our technicians were not available to check the issue. PATH's team intervened on our request and supported us in getting the issues resolved.”

- Soumen Sahu, Sub Divisional Officer (Road & Bridge Department)

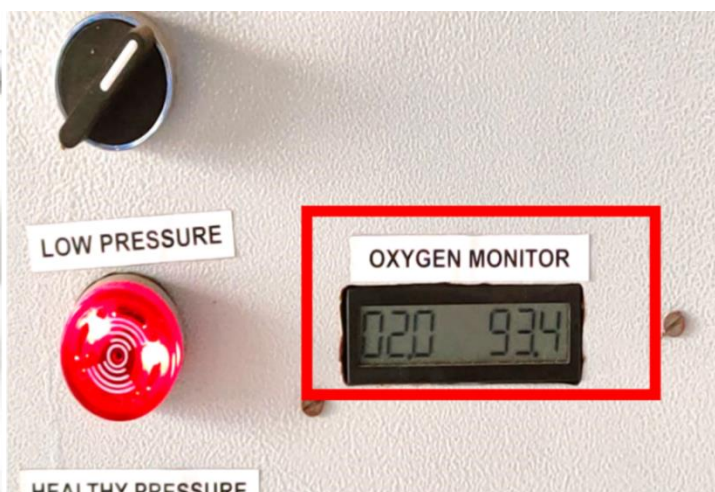
PATH's engineer also observed that there was much higher requirement of the medical oxygen in ICU than the quantity produced by the PSA plant. This increased demand reduced the oxygen pressure inside the tank, which, in turn resulted in the oxygen analyzer showing low pressure. The oxygen plant operators at the SCB Medical College and Hospital were instructed to keep additional oxygen cylinders filled as back-up. With PATH's assistance, the hospital added oxygen cylinders in the manifold unit, in addition to direct supply from the PSA oxygen plant via the medical gas pipeline system (MGPS), as a continuous source of oxygen.

"The on-site mentoring that we received on the operational aspects of the PSA plant and the manifold unit was very crucial. We had very limited knowledge on operation and maintenance of PSA plant. We needed these forms of technical assistance!"

- Suraj Panda, PSA oxygen plant operator, SCM Medical College & Hospital

Lessons Learnt

- **Training is not the only approach to strengthen capacities:** It is important not to wait for training sessions after installation of a PSA plant to strengthen capacities. On-site mentoring and troubleshooting support go a long way in building confidence of the new cadre of plant technicians.
- **Establishing Standard Operating Procedures:** Along with training and mentoring support, it is important to clearly define job expectations of each staff on management of the oxygen equipment as well as clearly establishing Standard Operating Procedures on operation and maintenance of PSA plants.
- **Facility level ownership, capacity and confidence in handling the PSA plant is crucial in quick response, trouble shooting and effective vendor coordination.** These in turn can resolve any machine related issues and helps PSA plant to be functional at all times.



Oxygen analyzer panel of the left showing oxygen pressure at 50.7 and on the right, after troubleshooting, showing 93.4



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