

Case Study - Building Engineering



AEE BESS with 3 Tower Cranes



- Loading: Tower Crane x 3
- AEE Model: AEE-500 (Old version)
- Input current: 90A (39kW)
- Duration: 12 hours a day

For the use of tower cranes, even though they are not constantly in operation, construction workers still need to turn on a large diesel generator in case it is required. This practice leads to wasteful diesel consumption and unnecessary expenses, especially given the fluctuating price of diesel in Hong Kong. Consequently, this results in increased costs and environmental pollution.



Grid
Grid Power: 39 kW
Grid Current: 90A

AEE-500(Old version)
Capacity: 500 kWh

3 x Tower Cranes
Loading Power (each): 120 kW
Loading Current (each): 280.5A

Long Distance between BESS & Tower Cranes



Challenge: BESS and tower cranes are 100 meters apart

Solutions: Installing a transformer between the wires connecting the BESS and the tower cranes increases the AC voltage, allowing for longer wire extensions and greater working distances while minimizing losses.

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The Challenge

The primary challenge is the high startup current required by tower cranes. In building engineering, it is common to use a Battery Energy Storage System (BESS) to support tower cranes, with the typical setup being one BESS for each tower crane. However, our situation of having one BESS paired with three tower cranes is unusual and highly unlikely to be feasible.

1. High Startup Current Demand

- **Inrush Current:** Tower cranes typically require a substantial inrush current during startup, which can be several times their nominal operating current. A single BESS may struggle to provide the necessary power to start multiple cranes simultaneously.

2. Limited Grid Capacity

- **Low Power Availability:** Rural areas often have limited electrical infrastructure, which may not provide sufficient power to meet the startup demands of multiple tower cranes.

The Result

- **Optimizing Power Utilization During Downtime:** The Battery Energy Storage System (BESS) can efficiently supply power to cranes during idle periods, reducing reliance on diesel generators. Storing energy generated during off-peak hours, enabling effective energy use when cranes are operating.
- **Minimizing Generator Runtime:** By limiting diesel generator use when cranes are not active, we can lower fuel consumption and achieve cost savings.
- **Decreasing Operational Costs:** Utilizing energy from the BESS instead of diesel fuel leads to lower operational expenses, promoting cost-effective and sustainable operations.

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