WHITE PAPER | PORTS, MARITIME TERMINALS, AND SHORELINE INFRASTRUCTURE

Ports and Maritime Terminals

How electrification, automation, surveillance, private networks, and harsh shoreline environments turn enclosure planning into a practical part of terminal reliability.

$3B	53	>300	PIDP	4X
EPA Clean Ports Program for zero-emission port equipment and infrastructure	Clean Ports grant awards announced by EPA	U.S. ports referenced by MARAD	Planning and capital project support through MARAD	NEMA review target when corrosion and washdown risk matter

Vessel	Terminal	Gate	Intermodal	Cabinet
Shore Power, Berth Equipment, Communications	Cranes, Yard Systems, Charging, Sensors	OCR, Cameras, Access Control, Networks	Rail, Truck, Warehouse And Data Systems	Power, Controls, Cable Entry and Service Access

Terminals are becoming electrical

Shore power, charging infrastructure, electric cargo-handling equipment, sensors, gates, cameras, and private networks all add protected field electronics.

The environment is demanding

Salt air, moisture, dust, heat, vibration, washdown, and equipment traffic can turn poor enclosure planning into operational risk.

Port modernization depends on protected field systems.

The visible assets may be cranes, vessels, trucks, and terminals, but the operating layer includes power, controls, communications, monitoring, cameras, access systems, and data equipment installed across the site.

- **Electrification**
- **Automation**
- **Security**
- **NEMA review**

Source note: Funding and program figures are current official-source references and should be refreshed before external publication.

Executive Overview: The Modern Terminal Is Connected

Ports and maritime terminals are moving more freight through increasingly complex operating environments. Cargo handling, gate processing, yard visibility, ship-to-shore coordination, rail and truck connections, security, environmental programs, and customer service all depend on reliable field equipment.

The current market is pushing terminals toward electrification, cleaner equipment, stronger supply-chain resilience, automation, surveillance, private wireless networks, and better operational data. Those improvements create practical infrastructure needs: outdoor cabinets for power distribution, controls, charging support, communications, cameras, sensors, access control, fiber handoffs, industrial networking, and backup power.

For port and terminal teams, enclosure planning is a reliability issue. Equipment is often installed near salt air, water, dust, vibration, washdown, heavy machinery, and vehicle traffic. Cabinets must be selected around the site environment, cable entry, thermal load, grounding, service access, corrosion risk, and future expansion. A standard indoor box is rarely enough for equipment that supports terminal operations outdoors.

Wireless, electric, and automated systems still need physical protection.

Every camera, router, charger interface, sensor, access controller, fiber handoff, and power device needs a protected place to operate and a practical way for technicians to service it.

- **Power**
- **Network**
- **Control**
- **Service**

Terminal system	Typical field equipment	Enclosure planning need
Electrification	Charging controls, shore power support, breakers, meters, monitoring	Power separation, thermal review, access, cable routing
Automation and operations	PLCs, I/O, sensors, network switches, cameras, OCR systems	Environmental protection, vibration awareness, labels, service loops
Private networks and fiber	Routers, radios, switches, fiber handoffs, antennas	Grounding, surge protection, weather-rated cable entry
Security and safety	Cameras, access controllers, gate equipment, alarms	Tamper resistance, service access, low-voltage organization

Why Ports Are Adding More Field Electronics

Port modernization combines physical infrastructure with digital and electrical systems. Even when a project begins as a wharf, gate, crane, charging, rail, or yard-improvement project, the operational value often depends on the supporting controls, communications, monitoring, and power equipment installed across the terminal.

Clean Ports and port infrastructure programs are moving terminal projects from planning into field deployment.

$3B	53	26	PIDP
EPA Clean Ports Program funding for zero-emission port equipment and infrastructure	Clean Ports grants awarded by EPA	States and territories represented in Clean Ports awards	MARAD planning and capital project program

Source: EPA Clean Ports Program and MARAD Port Infrastructure Development Program pages. Figures should be refreshed before publication.

Electrified cargo movement

Terminal tractors, forklifts, top handlers, railcar movers, harbor craft, and charging infrastructure may require new support equipment.

Shore power and charging

Vessel shore power, charging cabinets, switchgear support, metering, monitoring, and backup systems create field-cabinet needs.

Automation and data visibility

OCR gates, yard-management systems, cameras, sensors, PLCs, and industrial networks help terminals understand and move freight.

Security and access control

Ports need protected infrastructure for cameras, access devices, gate controls, communications, and monitoring in distributed locations.

Supply-chain resilience

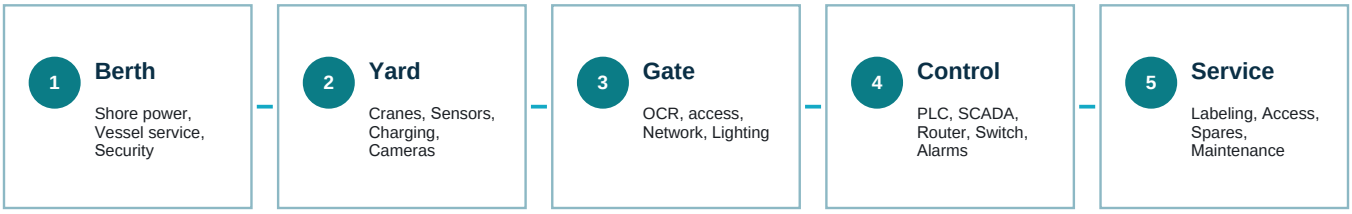
Modern terminals need infrastructure that keeps operations moving through weather, congestion, outages, and equipment downtime.

Harsh marine exposure

Salt air, humidity, corrosion, wind, water, dust, heat, and washdown require a stronger enclosure review than many indoor applications.

The Terminal Equipment Ecosystem

A modern port is a network of connected work areas. Berths, container yards, bulk terminals, gates, rail yards, warehouses, security checkpoints, maintenance shops, and utility areas all require equipment that must be powered, connected, protected, and maintainable.



Application area	Equipment likely to need protection	Planning note
Gate and access	Cameras, OCR hardware, access controllers, radios, network switches, power supplies	Plan low-voltage cable paths, access, weather rating, and tamper resistance.
Crane and yard operations	PLC cabinets, sensors, cameras, Wi-Fi/private network gear, warning systems	Review vibration, heat, dust, service access, and cable strain.
Electrification support	Charging controls, meters, disconnects, monitoring hardware, communications	Coordinate power equipment, thermal load, grounding, cable entry, and clearance.
Shoreline communications	Fiber handoffs, routers, radios, switches, antennas, UPS, surge protection	Review corrosion, bonding, lightning/surge exposure, and NEMA configuration.
Security and monitoring	Camera power, edge recorders, access panels, alarms, environmental sensors	Use organized layouts that support troubleshooting and future additions.

Ports are distributed field environments.

The enclosure strategy should follow the site map: berth, gate, yard, rail, warehouse, security, communications, and charging locations may each need different cabinet sizes and NEMA configurations.

- **Berth**
- **Yard**
- **Gate**
- **Rail**
- **Security**

Marine Environments Raise the Enclosure Standard

Port equipment is exposed to a combination of conditions that are difficult on electronics: salt air, humidity, rain, wind, dust from cargo movement, fuel residue, washdown practices, heat, vibration, equipment impact, and cable movement. These conditions make the cabinet selection as important as the device selection.

Condition	Risk to electronics	Enclosure planning response
Salt air and corrosion	Cabinet material, fasteners, cable glands, and mounting hardware can degrade over time.	Review NEMA 4X configurations and corrosion-resistant materials when the site requires them.
Water and washdown	Moisture intrusion can damage power and controls or create nuisance faults.	Plan gasketing, sealed penetrations, door practices, drip paths, and cable entry.
Dust and cargo debris	Airborne material can contaminate contacts, filters, fans, and electronics.	Review ventilation, filtration, sealed layouts, and maintenance access.
Heat and solar load	Electronics can run hotter in sealed cabinets or direct sun.	Evaluate heat load, sun exposure, ventilation, cooling, and equipment spacing.
Traffic and impact	Yard vehicles, forklifts, cranes, and maintenance equipment can damage exposed cabinets.	Plan mounting location, standoff protection, visibility, access, and service clearance.

NEMA 4X is a planning question, not a slogan.

For port locations exposed to corrosion risk, washdown, windblown dust, or shoreline conditions, project teams should review the exact NEMA configuration, cable penetrations, accessories, and installation details needed for the application.

- **Corrosion**
- **Washdown**
- **Cable entry**
- **Service access**

Technical note: NEMA enclosure type selection should be confirmed against the current NEMA standard, DDB documentation, and the exact installation environment.

Where DDB Enclosures Fit

DDB Unlimited supports port and maritime terminal projects by helping teams match outdoor equipment packages to practical enclosure requirements. The right starting point depends on the equipment list, site exposure, mounting location, cable paths, heat load, and service access needs.

WOD-62DXC

Wide single-bay outdoor platform

A useful direction where controls, network gear, monitoring devices, and serviceable layouts need additional width in a field cabinet.

63 in H x 32 in W x 30 in D, 33 RU

View WOD-62DXC

OD-78DXC

Tall single-bay outdoor platform

A practical option for racked communications, camera support systems, routers, switches, and localized power equipment.

79 in H x 28 in W x 30 in D, 42 RU

View OD-78DXC

3OD-62DXC

Triple-bay outdoor platform

A larger direction for terminal hubs that need space to separate power, networking, controls, backup, and future expansion.

62 in H x 88.5 in W x 25 in D, 99 RU

View 3OD-62DXC

Ready to plan a port or maritime enclosure package?

Contact DDB Unlimited to review terminal equipment, marine exposure, NEMA configuration, cable entry, grounding, thermal planning, and service access before the field installation is built.

Contact DDB | Call 800-753-8459 | View WOD Series

- Application review
- NEMA planning
- Outdoor cabinets

Planning Checklist and Conclusion

Ports and maritime terminals are becoming more electrified, connected, instrumented, and security-focused. That shift increases the number of field electronics that must survive in shoreline environments while remaining accessible to technicians.

The enclosure decision should not be left until the end of the project. Cabinet sizing, NEMA configuration, material review, cable entry, grounding, heat load, mounting location, and service access can all affect uptime, maintenance cost, and the ability to expand the system later.

Planning question	Why it matters
Where will the equipment be installed?	Berth, gate, yard, rail, warehouse, and shoreline locations can have different exposure and service conditions.
Is corrosion or washdown part of the environment?	Salt air, humidity, cleaning practices, and water exposure may point toward NEMA 4X review and accessory selection.
What power and communications are inside?	Charging controls, radios, routers, switches, sensors, cameras, and power devices can require separation and thermal planning.
How will cables enter and be serviced?	Poor cable entry planning can create water intrusion, strain, grounding problems, and difficult maintenance.
What will be added later?	Terminals often add cameras, sensors, network devices, chargers, and security equipment after the first phase.

Key takeaway

Modern terminal operations depend on protected field systems. Enclosures help turn electrification, automation, surveillance, and communications plans into maintainable outdoor infrastructure.

- **Protected**
- **Accessible**
- **Ready for growth**

Research Notes and Update Guidance

Source	Used for
MARAD Port Infrastructure Development Program	Port infrastructure planning and capital project context, including freight reliability and small-port set-aside.
EPA Clean Ports Program and Awards	Zero-emission port equipment, infrastructure, planning grants, award count, funding scale, and implementation timing.
EPA Clean Ports Q&A;	Eligible zero-emission infrastructure references including charging, hydrogen fueling, and shore power infrastructure.
U.S. DOT 2026 National Freight Strategic Plan	Freight resilience, visibility, and supply-chain modernization context.
NEMA enclosure type reference	Type 4X general protection and corrosion-resistance framing for enclosure-selection discussions.
DDB product pages and catalog model index	WOD-62DXC, OD-78DXC, 3OD-62DXC model dimensions, product-family positioning, and CTA links.