S&S TECHNICAL

ENGINEERING | FABRICATION | AUTOMATION

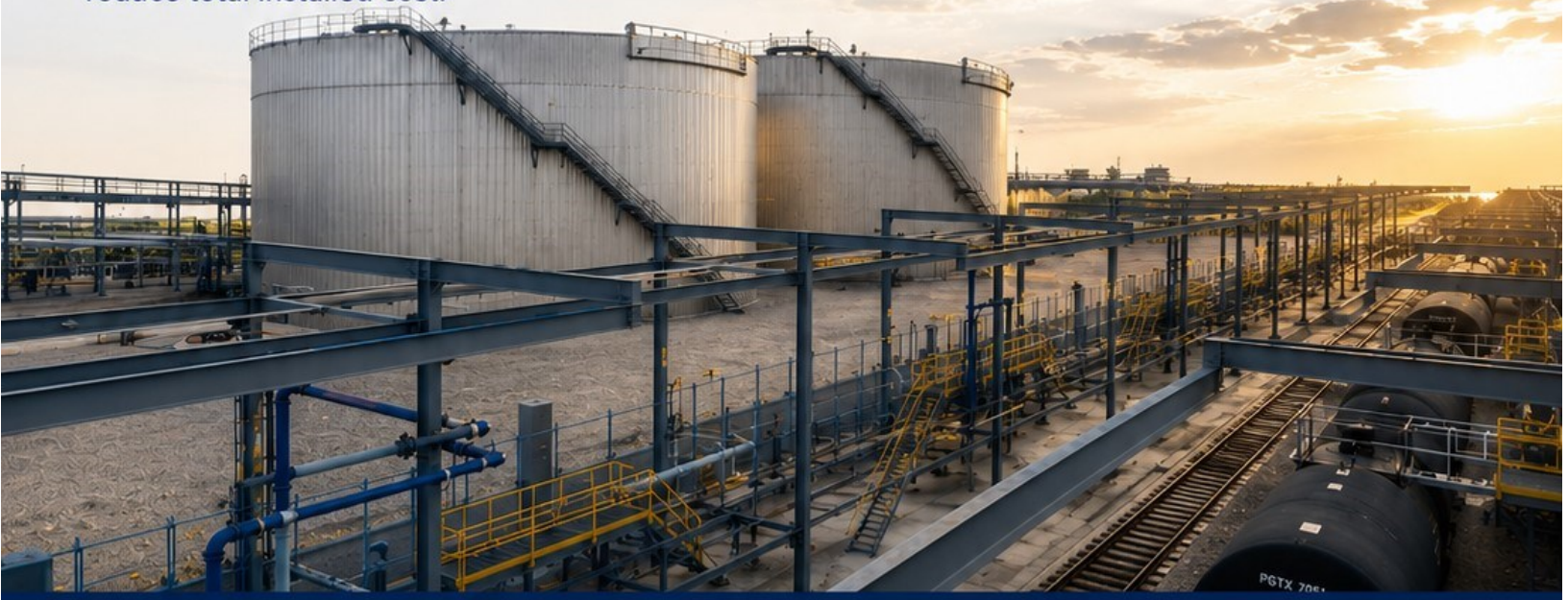
BEYOND THE RACK

ONE MISCONCEPTION IN THE INDUSTRY IS THAT

LOADING RACK STRUCTURES CAN ONLY BE ENGINEERED BY LOADING RACK MANUFACTURERS

The Loading Rack Is Not the Project. The Loading System Is.

How S&S Technical engineers complete truck and rail loading systems while providing flexible rack design, fabrication, and local construction strategies to reduce total installed cost.



INTEGRATED ENGINEERING
One team.
One solution.

FLEXIBLE PROCUREMENT
Engineered for options.
Built for value.

LOWER TOTAL COST
Reduce freight.
Simplify execution.
Save more.

REDUCED RISK
Fewer interfaces.
Better coordination.
Greater reliability.

BETTER OUTCOMES
Safer operations.
Higher performance.
Long-term results.

ONE SOURCE. ONE TEAM. ONE INTEGRATED SOLUTION. GREATER VALUE.

WHITE PAPER

A Modern Approach to Flexible Rack Design, Fabrication and Local Construction Strategies

Executive Summary

For decades, truck and rail loading rack projects were commonly approached as steel structure projects. End users would engage a loading rack manufacturer to design, fabricate, and often dictate nearly every aspect of the access platform, fall protection system, and associated equipment. In many cases, the loading rack supplier effectively became the focal point of the project.

Today's terminals, refineries, chemical facilities, renewable fuel plants, and bulk storage operations require a different approach.

The loading rack itself is no longer the project. It is only one component within a much larger loading system that includes process piping, custody transfer metering, loading arms, grounding and overfill protection, automation, controls, communications, safety systems, foundations, utilities, and site integration.

S&S Technical approaches loading projects from a systems perspective. Rather than forcing owners into a proprietary, rack-centric solution, S&S helps clients develop the complete loading system while providing flexible options for the loading rack structure itself. Depending on project goals, S&S can either fabricate the rack as part of a turnkey solution or develop the complete engineering package for fabrication by qualified local steel contractors.

This approach often reduces project costs, shortens schedules, increases contractor competition, and gives owners greater control over their projects.

The Loading Rack Is Only One Piece of the Loading System

A successful truck or rail loading facility requires the integration of numerous systems that must function together safely and reliably.

These systems commonly include:

- Truck loading racks
- Railcar loading racks
- Access platforms
- Gangways and fall protection systems

- Loading arms and hose management systems
- Ground verification systems
- Overfill protection systems
- Emergency shutdown systems
- Custody transfer metering
- Additive injection systems
- Vapor recovery systems
- Product piping
- Instrumentation
- Electrical systems
- PLC and automation systems
- Communications networks
- Structural foundations
- Drainage and civil improvements

When viewed from this broader perspective, the loading rack structure itself typically represents only a fraction of the overall project cost and engineering effort.

The challenge for many owners is that traditional loading rack suppliers naturally focus on the steel structure because that is their primary product. As a result, projects are often developed around the rack rather than around the operational requirements of the loading system.

S&S Technical reverses this process by first understanding the operational objectives, safety requirements, throughput targets, and site constraints before determining the most appropriate rack solution.

A Systems Integrator Approach Rather Than a Rack Supplier Approach

Traditional loading rack companies typically manufacture:

- Access platforms
- Gangways

- Fall protection systems
- Rack structures

Because these products represent their core business, many projects are structured around supplying the complete rack package from a single source.

While this model may be appropriate in certain situations, it is not the only path available to owners.

S&S Technical serves as a loading system integrator rather than solely a rack supplier.

Our focus is helping clients develop the most effective overall loading solution, regardless of who ultimately fabricates the steel structure.

This distinction provides owners with significantly more flexibility.

Instead of being limited to a proprietary rack package, owners can leverage local fabrication resources, regional construction contractors, and competitive bidding while maintaining a professionally engineered loading rack design.

Flexible Rack Delivery Models

Option 1: S&S Designs and Fabricates the Rack

For clients seeking a turnkey solution, S&S can provide:

- Structural design
- Detailed engineering
- Fabrication
- Equipment integration
- Project management
- Installation support

This approach provides a single point of responsibility while maintaining integration with the overall loading system.

Option 2: S&S Designs the Rack for Local Fabrication

For larger projects or projects located far from fabrication facilities, S&S can provide a complete engineered rack package while allowing fabrication to occur locally.

This model can include:

- Structural engineering
- PE-stamped calculations
- Fabrication drawings
- Permit drawings
- Foundation design
- Equipment integration drawings
- Contractor bid packages
- Construction support

The steel structure can then be competitively bid among qualified local fabricators.

This often creates substantial savings.

Why Local Fabrication Can Reduce Costs

Truck and rail loading racks are steel-intensive structures.

For larger projects, shipping costs can become significant due to:

- Multiple truckloads of structural steel
- Oversized platform components
- Large gangway assemblies
- Freight surcharges
- Long-distance transportation
- Jobsite logistics

In many regions, qualified structural steel fabricators already possess the capabilities required to fabricate loading rack structures.

By utilizing local fabrication resources, owners may benefit from:

Reduced Freight Costs

Large rack systems can require multiple flatbed shipments.

Eliminating cross-country freight can produce meaningful savings.

Increased Contractor Competition

Local fabricators can compete for the work, creating a more competitive pricing environment.

Reduced Schedule Risk

Local fabrication often reduces transportation delays and supply chain complications.

Improved Construction Coordination

Fabricators located near the project site can more easily coordinate with field contractors and respond to project changes.

Local Economic Benefits

Owners often prefer investing project dollars within the communities where facilities operate.

Engineering the Rack Correctly the First Time

One misconception in the industry is that loading rack structures can only be engineered by loading rack manufacturers.

In reality, loading racks are structural steel platforms designed to support personnel access, equipment, and operational loads while complying with applicable codes and standards.

S&S develops rack designs using sound engineering practices and project-specific requirements.

Our engineering scope can include:

Structural Design

- Platform framing
- Column sizing
- Bracing systems

- Equipment support framing
- Future expansion considerations

Foundation Design

- Spread footings
- Deep foundations when required
- Equipment support foundations
- Geotechnical coordination

PE-Stamped Calculations

- Structural analysis
- Load combinations
- Wind loading
- Seismic loading
- Equipment loading
- Live load requirements

Permit Drawings

- General arrangements
- Elevations
- Foundation plans
- Structural details

Fabrication Drawings

- Shop fabrication details
- Weld requirements
- Material specifications
- Bill of materials

Integration Is Where the Real Value Occurs

The greatest value in loading rack projects is rarely the steel structure itself.

The greatest value occurs where the structure interfaces with the loading process.

S&S designs racks with complete system integration in mind.

This includes:

Loading Arms

- Arm support design
- Foundation reactions
- Reach envelope analysis
- Vehicle spotting considerations

Ground Verification Systems

- Grounding monitor locations
- Cable routing
- Operator accessibility

Overfill Protection

- Junction box locations
- Sensor interfaces
- Conduit routing

Automation Systems

- PLC integration
- Communications systems
- Operator interface locations

Piping Systems

- Pipe support design
- Thermal growth considerations
- Maintenance accessibility

Electrical Systems

- Cable tray integration
- Conduit supports
- Lighting systems
- Area classification requirements

Safety Systems

- Emergency shutdown stations
- Safety showers
- Eyewash stations
- Access and egress routes

Traditional rack suppliers often focus primarily on the steel structure and access equipment. S&S focuses on how every component functions together as a complete loading system.

Supporting the Owner Through Procurement and Construction

Many owners do not have internal resources dedicated to managing rack procurement and contractor coordination.

S&S can provide support throughout the project lifecycle.

Services may include:

Bid Package Development

Preparation of detailed contractor bid packages that clearly define:

- Structural scope
- Fabrication scope
- Installation scope
- Equipment responsibilities
- Contractor deliverables

Contractor Bid Evaluations

Review of contractor proposals to ensure accurate scope comparisons.

Bidder Question Management

Development of formal responses to contractor RFIs during bidding.

Construction Support

- Drawing clarifications
- Site support
- Fabrication reviews
- Installation coordination

This level of involvement helps owners avoid change orders, scope gaps, and construction disputes.

The Future of Loading Rack Projects

The industry has evolved.

Owners increasingly recognize that loading rack structures are not proprietary products requiring a single-source supplier.

A properly engineered loading rack can be designed, permitted, competitively bid, fabricated locally, and successfully integrated into a larger loading facility without relying exclusively on traditional loading rack manufacturers.

What remains critical is having an experienced engineering and systems integration partner that understands how the rack interacts with every other component of the loading operation.

That is where S&S Technical provides value.

Conclusion

The question should no longer be, "Who will sell us the loading rack?"

The better question is, "Who will help us develop the best overall loading system?"

S&S Technical provides owners with a flexible alternative to the traditional rack-centric model. Whether supplying a complete rack package or developing a fully engineered design for local fabrication, S&S focuses on the entire loading operation rather than a single piece of steel.

By combining structural engineering, process expertise, loading equipment integration, permitting support, PE-stamped design, bid package development, contractor support, and complete loading system experience, S&S helps clients reduce costs, improve project flexibility, and achieve better overall project outcomes.

The loading rack remains an important component of every truck and rail loading facility. It simply is no longer the project itself.

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