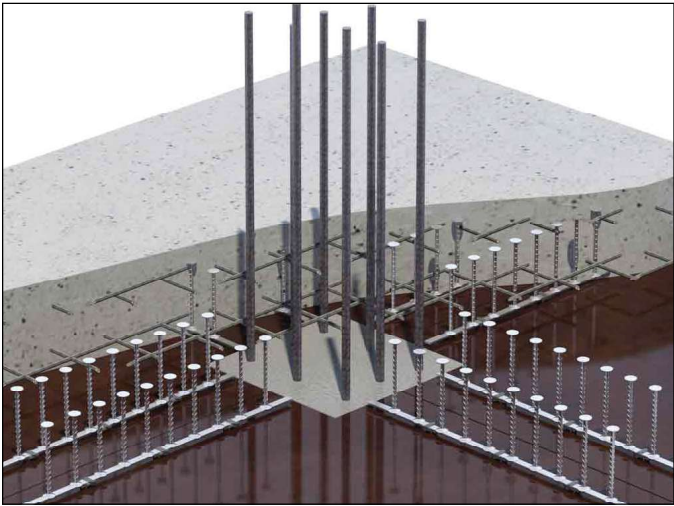


Stud Rail Reinforcement



IAPMO UES ER-614

Double Stud Anchor DSA Reinforcement

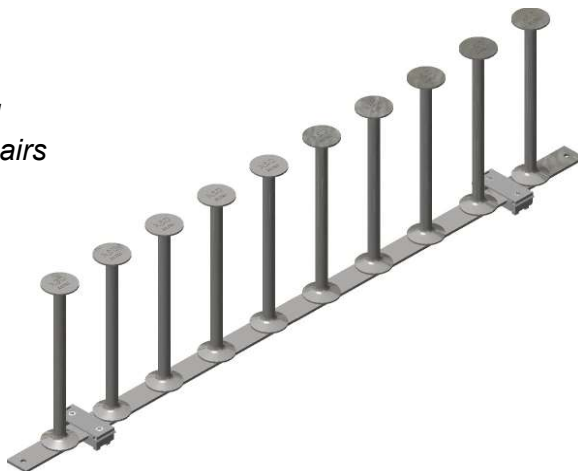
Stud Rail is a double-headed stud anchor (DSA) reinforcement system, typically used for concrete deck-to-column connections. The system is designed to transfer the load further into the concrete deck, create a larger shear area around the column, and resist punching shear forces.

Using the Stud Rail system can also eliminate the need for forming column capitals or drop heads. This provides significant savings, since these column details are difficult to form and place.

Each stud is double-headed so the load transfer is equal at the top and bottom of the Stud Rail assembly. Each stud is available in different sizes to match the engineered loads for each project.

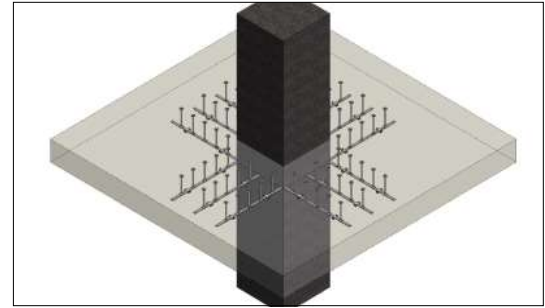
The Stud Rail assembly is available with a bottom strap or optional top wire, allowing the contractor to determine the installation sequence. The assembly can be positioned before or after structural reinforcement and/or post-tension tendons are placed.

*Stud Rail
with DSA Chairs*

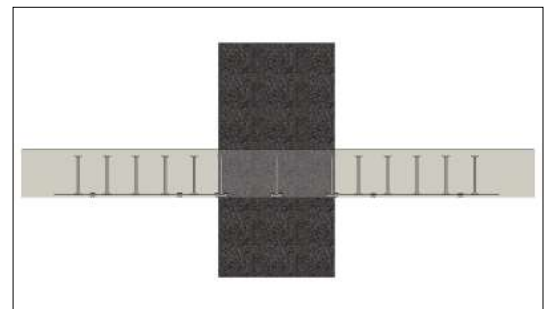


The Stud Rail assembly is engineered for every connection, on every floor, on every project. During production, each assembly is color-coded to correspond with the shop drawings for site installation.

This detailed planning eliminates field welding and reduces installation time, providing significant labor-savings and better shear load transfer.



Without Stud Rail, the deck-to-column connections are prone to punching shear failure.



With Stud Rail in place, the shear stress is transferred to a larger area around the column.

DSA Shear Reinforcement Specification A-1044-16 Type 2

The specification covers steel stud assemblies for shear reinforcement in concrete. The stud assembly consists of double-headed stud anchors attached to a steel shape (strap or wire). The steel shape is sufficiently rigid to position the studs in the appropriate reinforcement location, direction and spacing.

Steel Bars, Carbon and Alloy Specification A-29

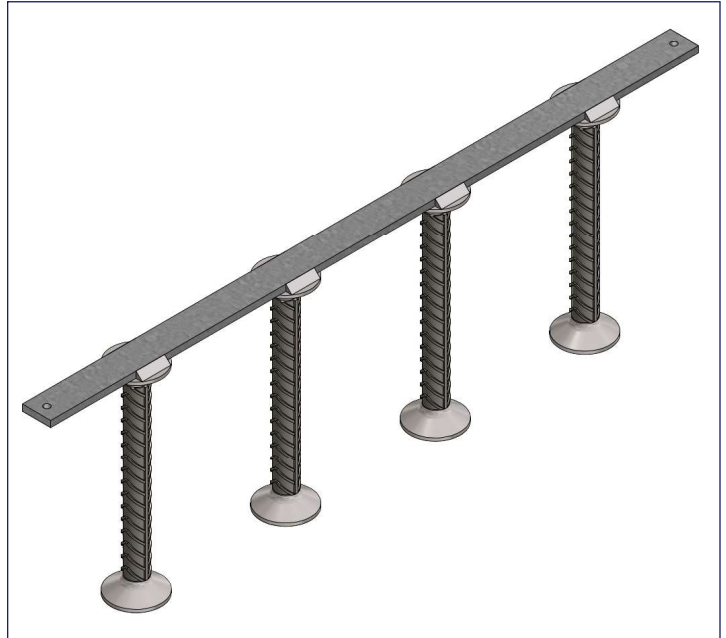
The specification covers steel stud properties for shear reinforcement in concrete. The minimum yield is 51 KSI, minimum tensile is 65 ksi, elongation in 2" equals 20%, and reduction area equals 50%.

Double Stud Anchor Rebar DSAR Reinforcement

Double Stud Anchor Rebar is primarily used to increase the punching shear resistance of cast-in-place concrete slabs without increasing the slab's thickness.

DSAR rails consist of double-headed ribbed studs attached to a steel flat bar for spacing during concrete pour.

DSAR can be used in slab-on-grade foundations and in elevated slabs, such as reinforced concrete slabs or post tensioned slabs. When used in elevated slabs, DSAR can eliminate the need for drop panels or column caps, thus reducing the costs associated with formwork.



DSAR Stud Rail Reinforcement

**Designing with 60 KSI yield
DSAR reduces total number of
studs by 14%
80 KSI yield DSAR available**

**Compared to traditional reinforcement
systems, DSAR has the following added
benefits:**

Meets requirements of ASTM 1044-16 type 2.

Meets ACI 318-19 for all slab thicknesses.

Reduces Congestion of reinforcement system.

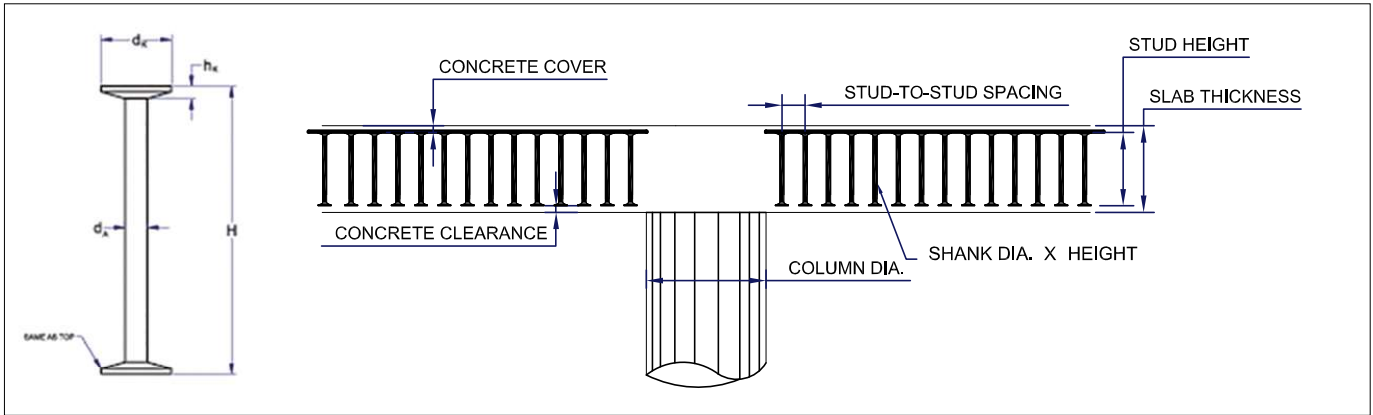
Quick installation times leading to reduced labor cost.

Thinner slab will allow for a lower floor-to-floor height.

Improves the ductility of slabs.

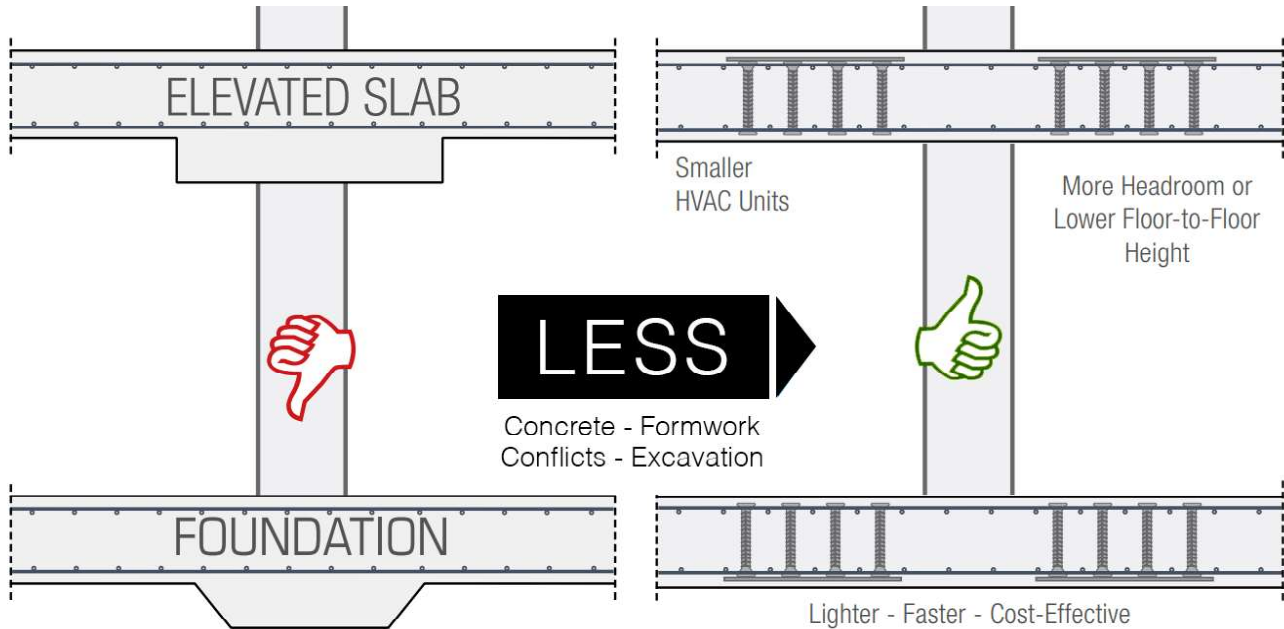


DSAR Stud Reinforcement



Anchor Size (H) + Concrete Cover + Concrete Clearance = Slab Thickness

DSA Dimensions					
Type	Description	dA	dK	hK	H
SBDSA38	DSA 3/8"	3/8"	1.190	0.210	Standard heights 5-1/2" to 12-1/2" (Custom on request)
SBDSA12	DSA 1/2"	1/2"	1.580	0.280	
SBDSA58	DSA 5/8"	5/8"	1.980	0.350	
SBDSA34	DSA 3/4"	3/4"	2.370	0.420	

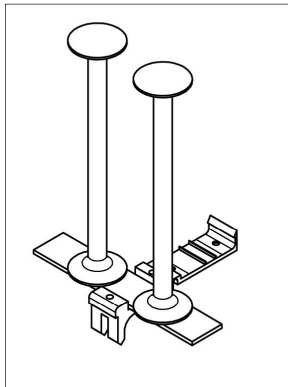


DSAR Dimensions					
Type	Description	dA	dK	hK	H
SBDSAR38	DSAR 3/8"	#3	1.190	0.210	Standard heights 5-1/2" to 12-1/2" (Custom on request)
SBDSAR12	DSAR 1/2"	#4	1.580	0.280	
SBDSAR58	DSAR 5/8"	#5	1.980	0.350	
SBDSAR34	DSAR 3/4"	#6	2.370	0.420	

Stud Rail DSA Plastic Chairs

On most Stud Rail projects, DSA Plastic Chairs are necessary to maintain proper positioning and concrete cover. Plastic chairs are available in four sizes to meet these project dimensions and specifications.

When installed on the project, the DSA Plastic Chairs are simply snapped closed over the Stud Rail strap and fastened to the deck through the preformed holes with nails or screws.



DSA Plastic Chair Height			
Type	Description	Overall	to Strap
SBDSAPC34	DSA 3/4" Plastic Chair	7/8"	3/4"
SBDSAPC1	DSA 1" Plastic Chair	1-1/4"	1"
SBDSAPC112	DSA 1-1/2" Plastic Chair	1-3/4"	1-1/2"
SBDSAPC2	DSA 2" Plastic Chair	2-1/8"	2"

DSAR Plastic Chairs

On most Rebar Stud Rail projects, DSAR Plastic Chairs are necessary to maintain proper positioning and concrete cover. Plastic chairs are available in four sizes to meet these project dimensions and specifications.

When installed on the project, the DSAR Plastic Chairs are simply snapped closed over 1-1/4" or 2" Rebar Stud Rail straps and fastened to the deck through the preformed holes with nails or screws.



DSAR Plastic Chair Height			
Type	Description	Overall	to Strap
SBDSARPC34	DSAR 3/4" Plastic Chair	7/8"	3/4"
SBDSARPC1	DSAR 1" Plastic Chair	1-1/4"	1"
SBDSARPC112	DSAR 1-1/2" Plastic Chair	1-3/4"	1-1/2"
SBDSARPC2	DSAR 2" Plastic Chair	2-1/8"	2"

Bar Support – Wire slab bolsters and high chairs, with optional epoxy-coat, plastic-dip, plastic-tip or plate, to meet almost any slab requirement.

Bridge Deck – Overhang brackets and hangers provide an efficient deck forming solution for precast concrete or steel I-beam bridge structures.

Coil Ties – 2-Strut and 4-Strut designs, in standard and heavy-duty capacities, with optional cones, waterseals or custom combination, for job-built forming.

Dowels – Plates, sleeves, baskets and joint nosings for high-performance concrete floors.

Euro Rod – 15mm and 20mm taper ties, she-bolts, inner ties, washers and wing nuts compatible with European-brand forming systems.

Metal Rib – Leave-in-place, expanded galvanized mesh to form footings, bulkheads, grade beams, pier caps and blindside walls.

Pipe Braces – Contractor-preferred braces, with rated capacities and lengths ranging from 7'6" to 62'6", for almost any forming application.

Precast – Inserts, anchors, connectors and lifting systems for efficient precast concrete production.

Self-Riser – Integrated hydraulic system for multi-story building cores that virtually eliminates crane time.

Shoring – A conventional 12K load/leg system, with base plates, cross braces, screw jacks and U-heads, for productive deck support.

Snap Ties – Ties and brackets, with ¾" plywood and 2x4 lumber, create a simple and effective plywood forming system.

Staybox – A pre-engineered and pre-assembled rebar keyway that simplifies forming at wall and deck intersections.

Stud Rail – A reinforced column-to-deck connection that reduces shearing, transfers load further into the slab and eliminates column capitals.

SurePly™ – An industry-recognized handset system, with more than 80 standard panel and filler sizes, for almost any forming application.

Tilt-Up – A start-to-finish system of lifting inserts, plates and hardware for tilt-up panel construction.

Walers – Double channel walers align panels, carry taper tie loads and maximize the surface area of almost any gang.