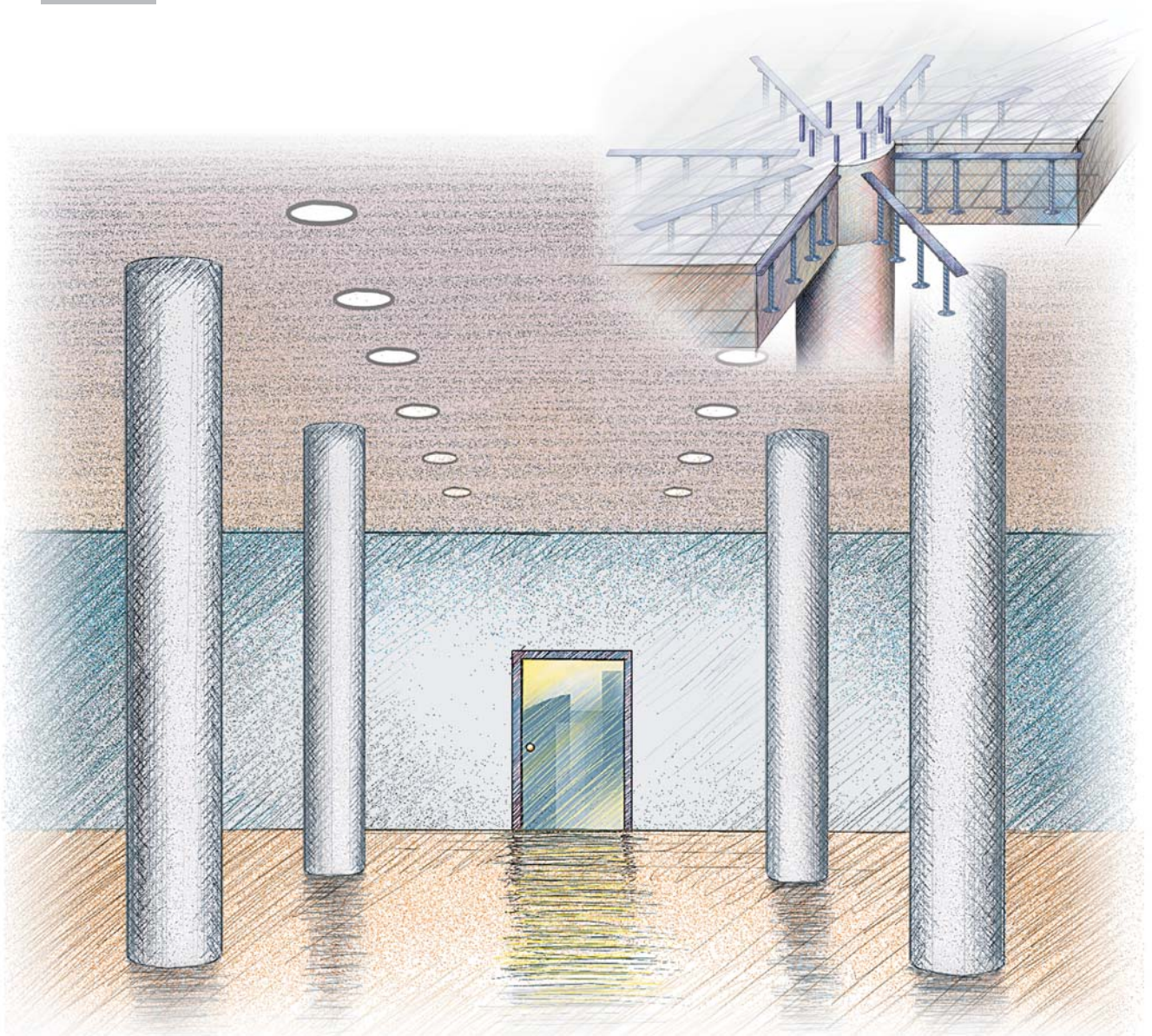




JORDAHL®
FIXING TECHNOLOGY



JORDAHL®-Studrails JDA

Deutsche Kahneisen Gesellschaft mbH Berlin

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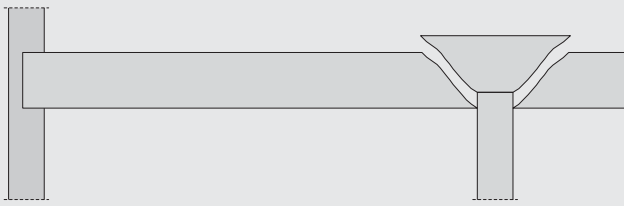


Fig 1: punching failure

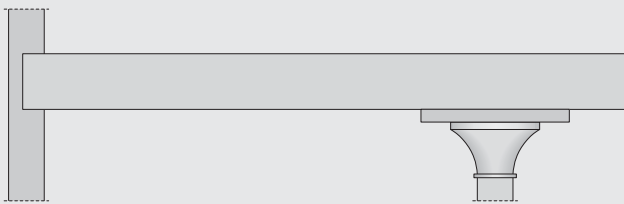


Fig. 2: mushroom floor slab with column capitals

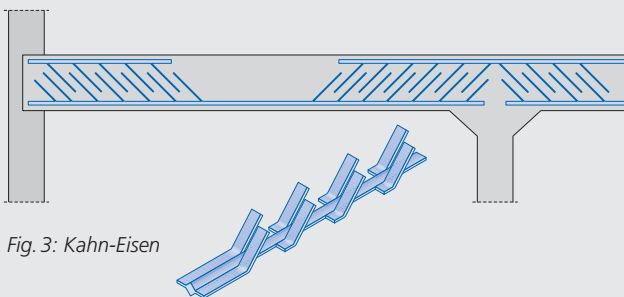


Fig. 3: Kahn-Eisen

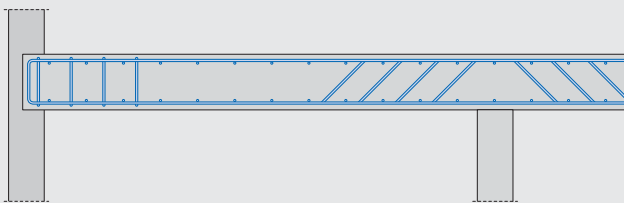


Fig. 4: flat ceiling with bent-up rebar

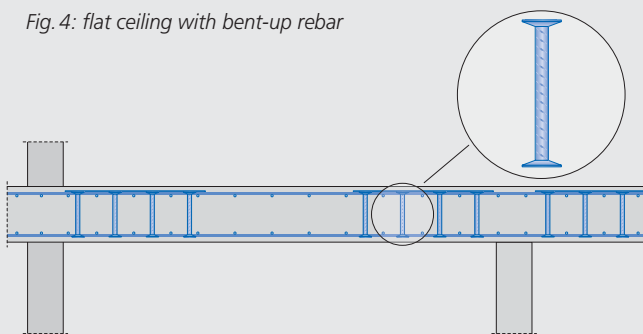


Fig. 5: JDA-punching shear reinforcement

A piece of history

The product name "JORDAHL" invokes memories of a pioneer of fixing technology and the inventor of the cast in channel. Our company name "KAHNEISEN" goes back even further, to the start of reinforced concrete. Kahn steel (Fig. 3) was already in use as reinforcing steel at the beginning of the 20th century. It had upturned wings that resisted transverse forces in the ceiling panel area. The involvement of the Kahn Brothers in the reinforcement of concrete and the optimum utilisation of cross-section and form was the stimulus for us when incorporating studrails into our product range.

Flat roof structures with large spans between supporting columns, allow optimum use of large area factory or warehouse buildings.

Advantages

- underside of ceiling has flat appearance
- less outlay for formwork
- optimum use of space

However, even in the early days of concrete structures, the problem of punching shear at the column head area (Fig. 1) was recognised. An alternative to get around the troublesome downstand was the design of column capitals in about 1900 (Fig. 2).

More recently, plates with stud type supports in accordance with DIN 1045 have been adopted. These can be designed with or without a capital and with saddles or angled wings for thrust reinforcement depending upon the loading conditions. This solution will often result in thick slabs, a limitation of spans between supporting columns and it is time consuming at installation time (Fig. 4).

As an alternative, Andrä et al have proposed doweling the area weakened by the punching shear using dowel strips. This solution was developed further to produce studrails made from reinforcing steel, each with two swaged heads (Fig. 5).

With implementation of german standard DIN 1045-1:2001 a basic revision of the german approval became necessary. The new german approval Z-15.1-214 corresponds with the partial safety factor approach (like in the Eurocodes) and replaced the old approval Z-15.1-172.

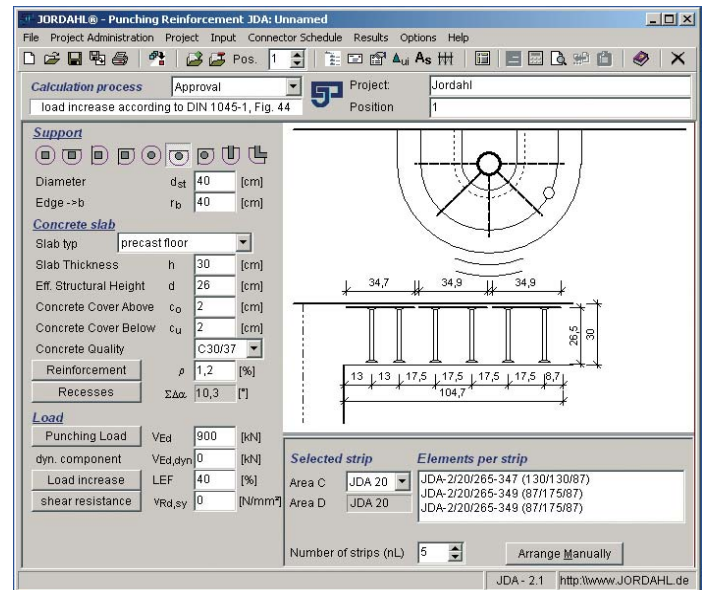
Further information

More technical information is available by contacting us at the following address:

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The made-to-measure solution JORDAHL® JDA Studrail



The solution: JDA studrail

Double-headed anchors have achieved the best results in tests. In practice they have shown themselves to be a particularly efficient and economical method of punching shear reinforcement. JORDAHL® JDA studrail consists of double headed anchors connected by a metal strip. Alternative spacing methods are also available to suit specific installations, e.g. with spacing rods for use in precast slabs.

Advantages

- Construction authority approved for static and dynamic loads (to meet the requirements of BS, ACI, DIN, Eurocode and CSA)
- Higher loading with slip resistant transmission of force due to the arrangement of the anchor heads on each side
- Optimum slab thickness, can be achieved for slab thicknesses above 18 cm
- Saves time by fitting from above after laying the whole of the reinforcement cage
- Suitable for precast slabs by fixing on the formwork or by laying on mesh supports

Anchor support capabilities

anchor diameter d_A [mm]	head diameter d_K [mm]	head thickness h_K [mm]	anchor cross section A [mm ²]
10	30	5	79
12	36	6	113
14	42	7	154
16	48	7	201
20	60	9	314
25	75	12	491

The service

JORDAHL® provides custom solutions, made-to-measure:

- To suit your design criteria and specific application requirements
- with skilled technical advice and
- fast and flexible delivery
- calculation software

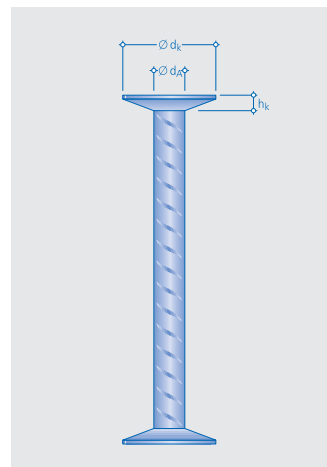
The product

The JORDAHL® studrail is manufactured to the appropriate static requirements.

The double headed anchors can be supplied with $d_A = 10, 12, 14, 16, 20$ and 25 mm. The length of the anchor is between 125 and 650 mm.

Longer lengths can be manufactured at the customer's request.

Double-headed anchors are made from BSt 500 S and the connecting strip is made from structural steel.



JORDAHL®-JDA Studrail

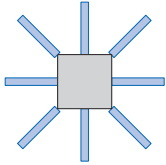
Applications / Installation

Range of applications

Depending on the architectural or design criteria, studrails can be adapted for use at slab edges, in corners and piers.

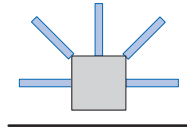
Examples 1 to 9 below indicate a typical range of applications for JORDAHL® studrails.

Example 1



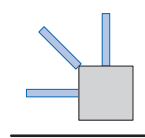
Rectangular internal support

Example 2 + 3



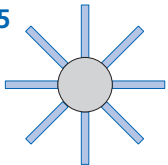
Rectangular edge support

Example 4



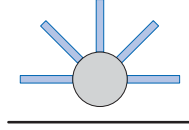
Rectangular corner support

Example 5



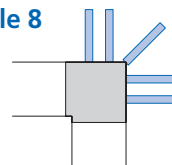
Round internal support

Example 6 + 7



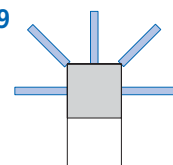
Round edge support

Example 8



Internal corner

Example 9



End of wall

Additional application solutions

When used in suspended installations, the free anchor heads must extend at least to the lower edge of the bottom layer of reinforcement and, in upright installations, to the upper edge of the top layer of reinforcement.

At the same time, the required concrete cover must be maintained.

Installation from above

This is the most common way: first install all the rebar, then push the studrails through the mesh.

Installation from below using JDA-FT-KL

JDA studrail is fitted on the formwork using connecting strips on suitable spacers. This version is installed in three steps:

- position the metal strips with spacers on the formwork
- install all rebar and lattice girders
- click the anchors into the metal strip



Installation of JDA-FT-KL (the click version)



Installation from above for in situ concrete

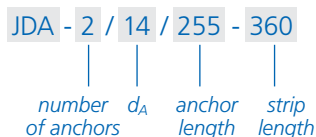


Installation underneath lattice girders in precast elements

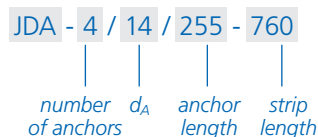
Ordering example, Enquiry specification text, Software

Ordering example

JDA-Standard

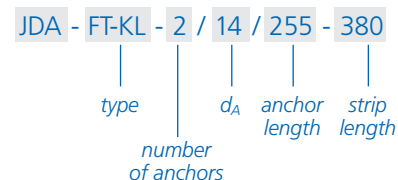


JDA optimized



anchor spacing: (lk1/lA1/lA2/lA3/.../lk2)

JDA-FT-KL (for precast)



anchor spacing: (lk1/lA1/.../lk2)

Spacers For installing JDA from below you need suitable spacers between strip and formwork. Spacers for **15, 20, 25, and 30 mm** are available.

Enquiry specification text

To provide JORDAHL® punching shear reinforcement JDA to supplement the reinforcement of areas weakened by penetration on flat roofs of thickness $d = \square$ cm with point type supports and to install in accordance with information provided by the support structure designer.

Punching shear reinforcement

Type JDA- \square / \square / \square - \square , \square pieces

Order list from software

The result of the JORDAHL®-software can be printed in form of an ordering schedule.

JORDAHL BEFESTIGUNGSTECHNIK		Project:	Page:	
		Proj. No.:		
JORDAHL® - Punching Reinforcement JDA - Connector Schedule				
Company:		Date: 19.04.2005		
		Printed from: 19.04.2005		
		Designer:		
No.	Position	No. Pos	No. strips	strip
1	1	1	5	JDA-2/20/265-337 (130/130/77)
			5	JDA-2/20/265-309 (77/155/77)
			5	JDA-2/20/265-309 (77/155/77)

Calculation example

On your request we will send example calculations or help with specific customer enquiries.

Software

We provide easy-to-use calculation software for you to select the correct JDA studrail.

- Calculation in accordance with construction authority approval No.7-15.1-214
- compatible with DIN 1045-1 using partial safety factors



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We reserve the right to modifications within the framework of continued development concerning the product and application methods.



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FIXING TECHNOLOGY



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