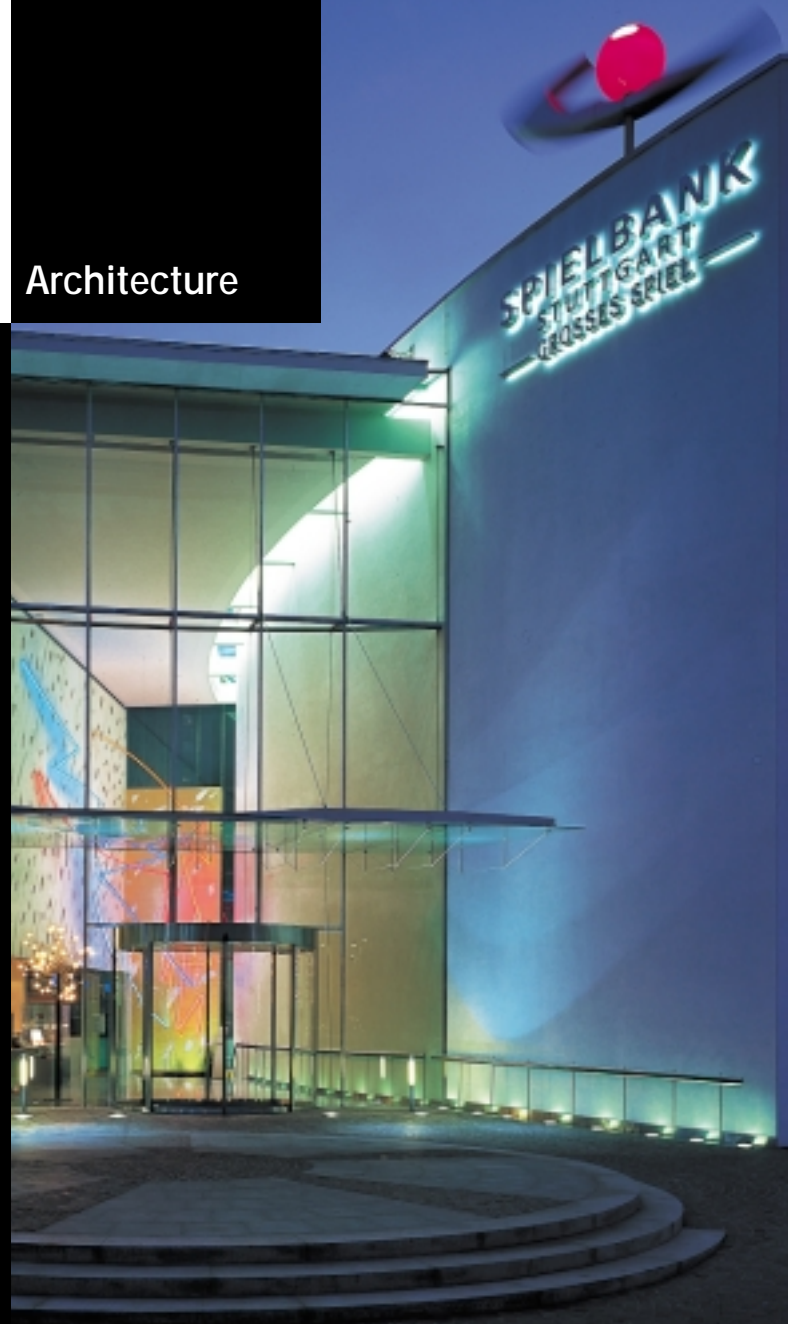


Intricate Architecture

# RODAN

Tie System



# The Tie System

## Symbol of the times.

Architecture is taking on a new dimension: Room design based on expansive integrity with precision and perfection determining the detail.

Outstanding constructional elements are needed to give intricate buildings their stability. Their material must be pure quality, their shaping immaculate and their functionality beyond reproach.

Optimised to meet the highest demands, the RODAN tie system epitomises modern, lightweight and transparent architecture. Offering outstanding design credentials, its capabilities have been authenticated by renowned institutions.

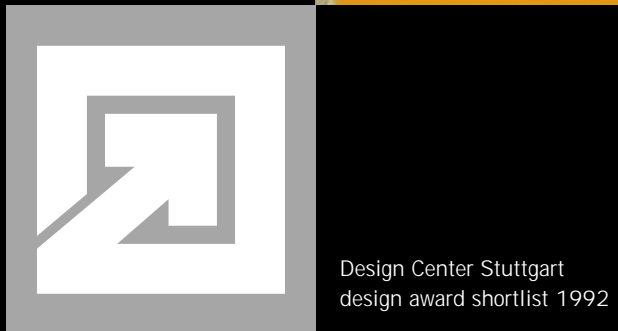
And this first-class innovation for flexible, advanced construction has already brought significant market success.

Take a look for yourselves and be impressed by a product apart.

## Cast in quality.

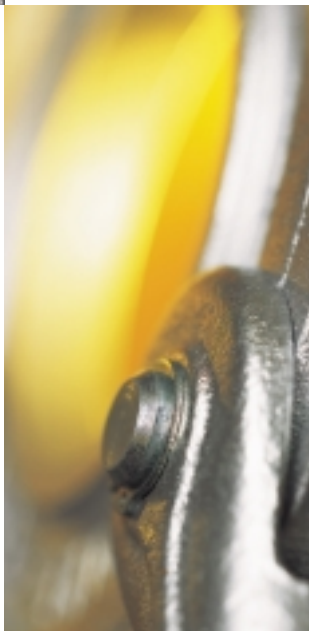
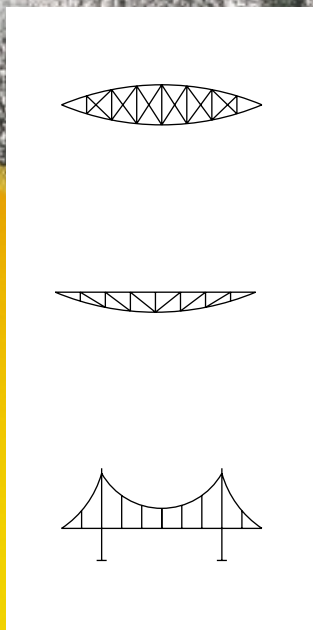
The very latest technologies have been utilised in the development of the RODAN tie system in order to unite form and function to best effect. And the results are indeed convincing.

The RODAN tie system comes with a German type approval (Regierungs-präsidium Karlsruhe). It is quality-certified and subjected to third-party verification by the Research Institute for Steel, Timber and Masonry of the University of Karlsruhe.



Design Center Stuttgart  
design award shortlist 1992





#### Contents:

Pages 4 und 5  
The Tie System

Pages 6 and 7  
The System Components

Pages 8 and 9  
The Connecting Elements

Pages 10 and 11  
Trussed Glass Panels

Pages 12 and 23  
Example Applications

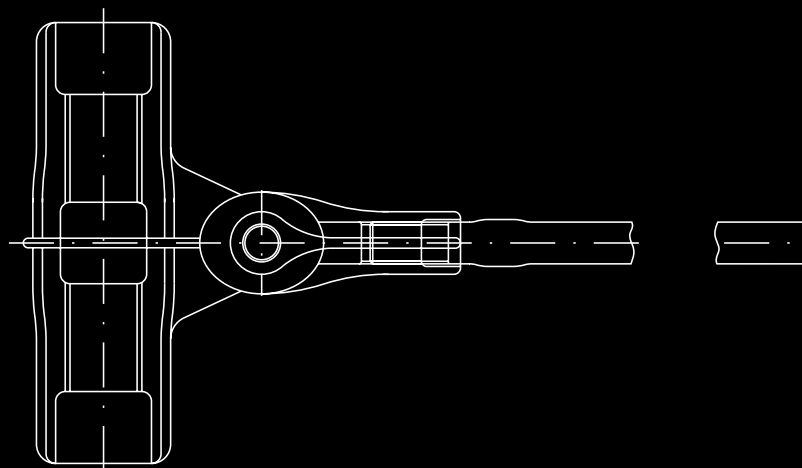
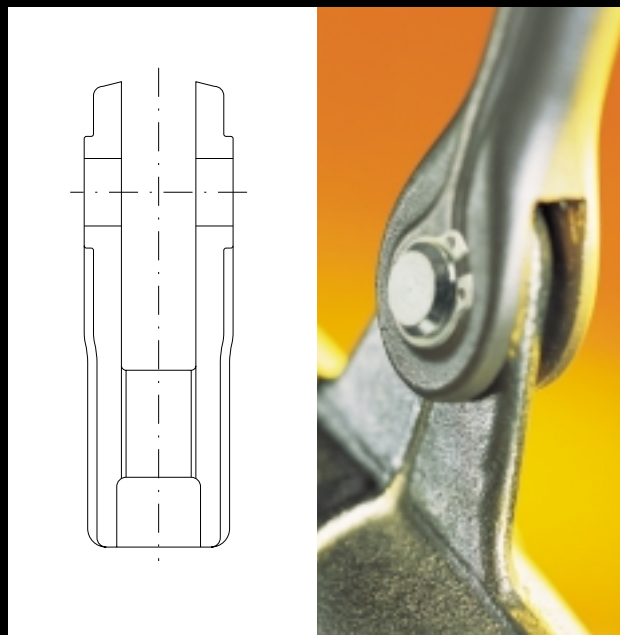
Pages 24 and 25  
Dimensions and Bearing Loads

Pages 26 and 27  
Safety and Support

# The Tie System

## Patented for creativity.

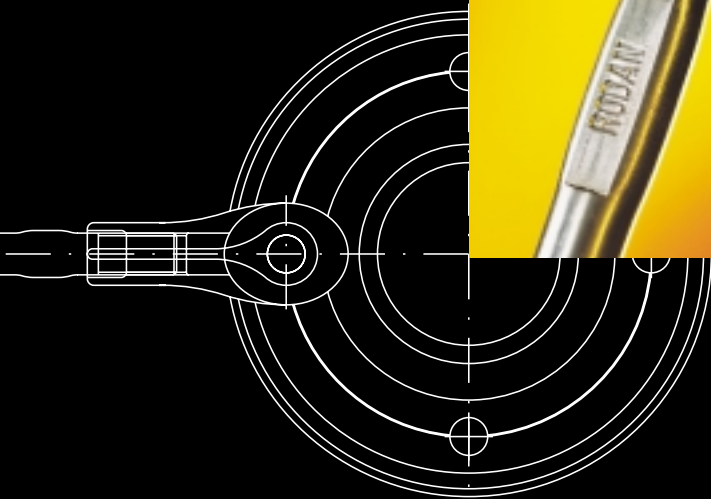
Round section rods and fork end pieces: The components of the RODAN tie system form a flexible unit supplemented by circular hubs and couplers. Patented in many industrial countries of the world, the RODAN range offers amazing technical compass and design versatility. These few different individual components afford the creator of contemporary, intricate architectural designs almost unlimited scope. From the simple tie rod connection to complex cross-bracing networks, all he has to do is mix and match - et voilà!



The materials for major tasks and tough requirements: Fork end piece, circular hub and coupler manufactured in nodular cast iron or cast stainless steel.



Embossing with a function: The round-section rod of the RODAN tie system is especially formed with wrench flats to facilitate assembly.

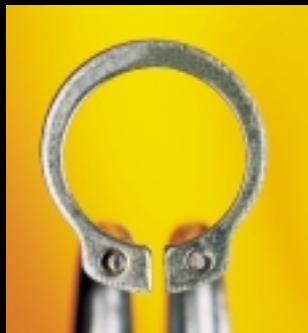




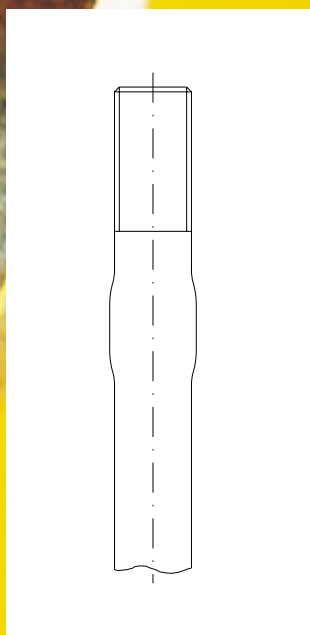
## The System Elements

Every detail deliberately devised.

The fork end pieces of the RODAN tie system consist of a casting with a left-hand or right-hand thread, a pin and two circlips. The left-hand thread is easily recognised by the recess next to the pin hole. The pin ensures a good connection between the fork end piece and the eye bar. And notice the soft, droplet-shaped transition from tensile element to its anchorage. Aesthetically elegant, technically efficient and ideally dimensioned for maximum material economy.



Precision location: Circlips applied by means of special pliers provide a simple yet effective fixing for the pin in the fork end piece.



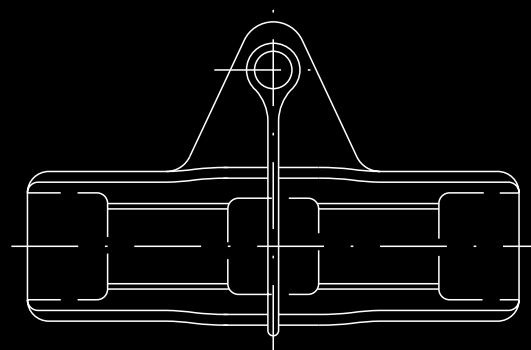
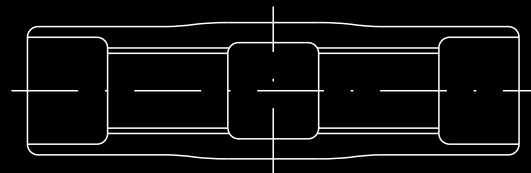
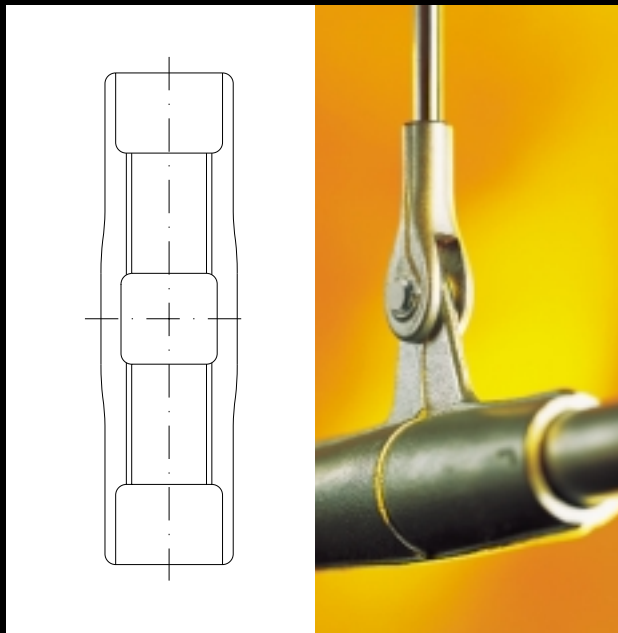
Invisible connection:  
The round-section rod also features a right-hand and left-hand thread at either end to match the respective fork end piece, so facilitating assembly and in-situ adjustment.

# The Connecting Elements

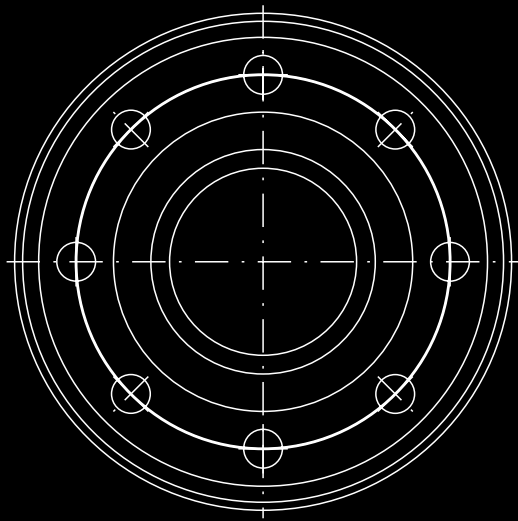
## Flexible on all sides.

Ideally, structural components should be designed to ensure effective implementation of the creative ideas of architects and designers without the need for compromise. Here, the coupler and circular hub in particular provide planners with major degrees of freedom. These two cast components complement the RODAN tie system perfectly – not only in terms of material and functional co-ordination but also in relation to the individualised design criteria they can satisfy.

Large spans can be applied without any safety worries - the coupler provides the link for long distances. And for location of position, a further tie rod can be attached to it via the eye bar.







Well-rounded personality:  
Up to eight fork end pieces  
can be connected to the cir-  
cular hub wherever several  
tie rods have to be linked to  
a central point. An ideal  
solution for cross-bracing  
systems or pyramid-shaped  
roofs with horizontal trusses.

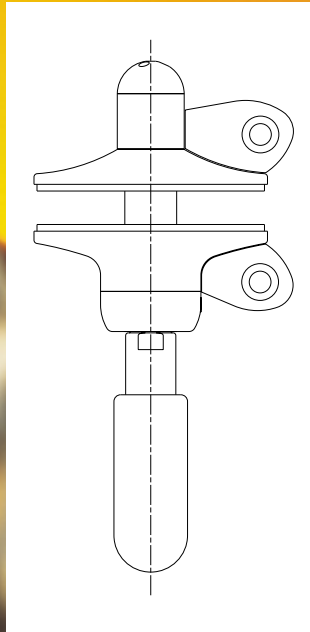


## Trussed Glass Panels

### Extending the limits.

The combination of RODAN tie rods and RODAN glass clamp mountings results in a fascinating system offering outstanding integrity combined with almost unbounded transparency. Trussed glass panels: Where stabilising substructures are usually required, this patented solution is unique in its ability to bridge enormous spans without the need for additional elements. Central support points, incorporated in the overall framework, are connected by compressive members and tie rods to the glass clamp mountings attached to the substructure. A perfect support act for those intricate architectural visuals.





Enhanced safety through stress relief: There is an optimised glass clamp mounting to suit different patterns of static, suction and compression loading.



## Intricacy and Lightness

High points of architectural art: As proud as the masts of any ocean-going sailing yacht, these guyed supports stretch up into the skies above Wiesbaden in Germany. And from there down to the anchor points, RODAN tie rods secure the canopy roof of the R + V insurance company building.

With the RODAN tie rod system, bracing networks can be designed to be so slender that they are virtually invisible. The result is a floating effect with structures of exceptionally lightweight appearance.



R + V Versicherungen,  
Wiesbaden  
Architects:  
Kammerer + Belz  
Kucher und Partner,  
Stuttgart  
Structural engineers:  
Boll + Partner



Powerful resistance: The bracing system for the canopy roof is able to support the deadweight, snow loads and wind suction loads with capacity to spare.



Protection against wind and weather: In spite of its long cantilever extension, this canopy roof is also able to withstand everything the weather throws at it.



## Visions of Weightlessness

A solution without parallel:  
A historical ruin, tough regional building regulations and heritage authority rules combined to produce a tight network of constraints on the design of a transparent roof for this 13th-century castle in southern Tyrol. Yet the glazing assembly appears to float above the masonry. The panes, mounted on a fish-belly support structure, cover an area of approx. 200 square metres. The large spans applied would not have been possible without a new and patented system of trussed glass panels.

The RODAN ties follow the roof pitch and, combined with RODAN glass clamp mountings, assume a statically defined bearing position. The glass panels reinforce the roof plane and there are no additional bracings.



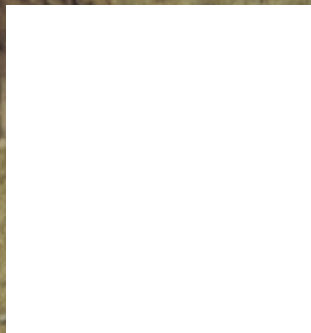
Juval castle in southern Tyrol  
Owner: Reinhold Messner  
(the famous mountaineer)  
Design and construction:  
Robert Danz Dipl.-Ing.,  
architect and structural  
engineer, Schönaich







The glass panes and the steel support are designed on the basis of an assumed snow load of 185 kg per square metre.



At the beginning of the planning stage it was imperative to perform a precise survey of the wall copings, with a maximum tolerance of three millimetres.

## Space – the Final Frontier

All-glass lobby no big gamble: The entrance of the "Spielbank" – or casino – in Stuttgart comprises two integrated components, a double-glazed vertical façade and the cantilever canopy of laminated safety glass. The horizontal stability of the façade is ensured by wall-to-wall lattice girders, while its vertical rigidity is provided by tie rods in the connection nodes between the girders, in the floor and in the ceiling. The canopy roof is also transparent – a construction of trussed glass panels mounted on special stainless steel profiles that are likewise braced by tie rods to the lattice girders located behind the façade.



Stuttgart Casino  
Architects:  
Fiedler Aichele, BDA,  
Stuttgart  
Design and construction of  
the façade with canopy roof:  
Robert Danz Dipl.-Ing.,  
Schönaich





The trussed glass panels were mounted on the steel structure of the canopy roof.



Inviting: With the minimalist support structure, the entrance façade offers a friendly, enticing transparency.

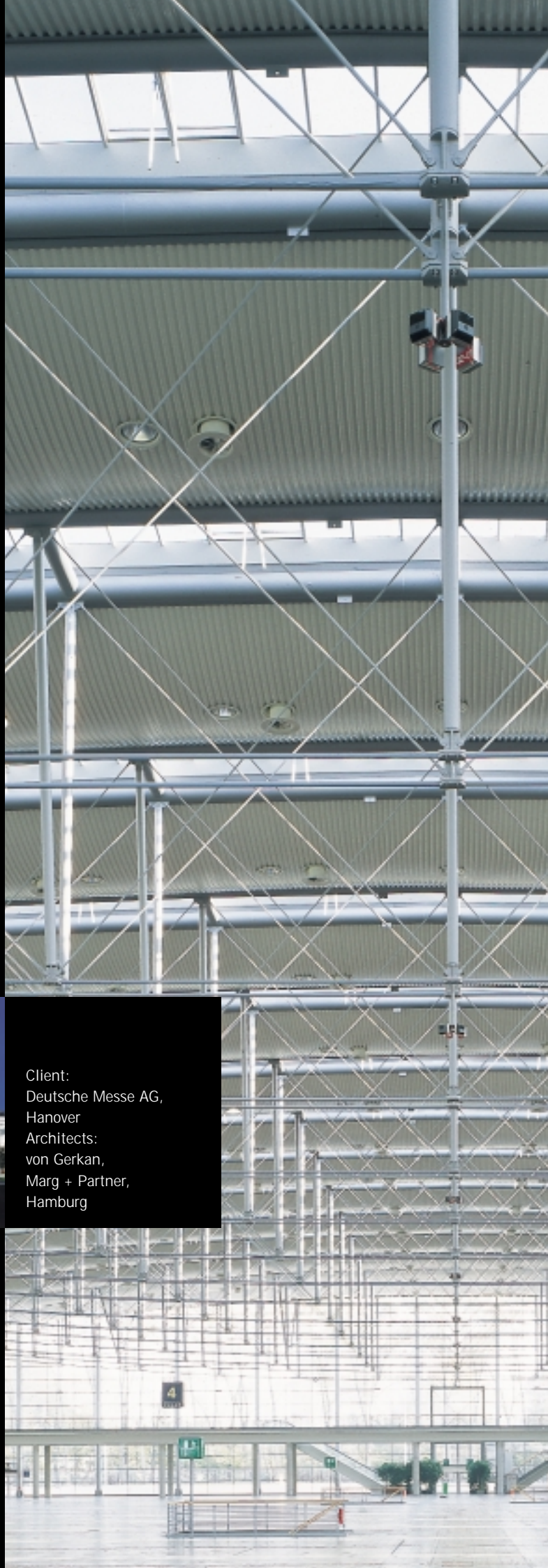


## Generous Architecture

An expansive, light-flooded display area: This concept for Hanover Fair's exhibition hall 4, measuring 24,000 square metres, is based on a roof structure which requires no upright supports, so giving the impression of remarkable lightness of weight. Eighteen tubular steel trusses bear the roof of trapezoidal steel sheet over a span of 122 metres. The top and bottom chords of the fish-belly girders are straddled by compressive members. For stabilisation in the face of unilateral loads, intersecting diagonals of RODAN tie rods are also integrated in the trusses. Eye bars of steel plate form a floating pendulum bearing for the trusses between the shear walls.



Client:  
Deutsche Messe AG,  
Hanover  
Architects:  
von Gerkan,  
Marg + Partner,  
Hamburg





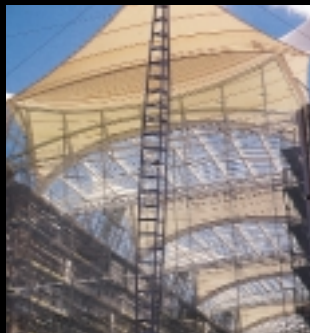
The hall opens up to the east and west via the wholly glazed gable facades. Together with the highly effective zenith lighting produced by the 16 overhead strips, the hall is illuminated with daylight throughout its entire depth.





## Maximum Transparency

Glass panels for the gable side: Glass façades of up to 23 metres in height connect the two masonry sections of the shopping mall on the Kirchberg plateau in Luxembourg. Owing to the fact that the building structure was designed to allow for deformation, the specification initially stipulated 15 millimetre thick panels in a format of 2.10 x 1.80 metres and load transmission to a steel substructure. The patented system of trussed glass panels, however, produced a much more transparent and cost-efficient solution: Fewer glass panels with reduced thickness and twice the size at 2.10 x 3.60 metres were trussed and braced using RODAN ties. The system operates independently of the substructure as a bearing element and is able to absorb wind suction and pressure loads with equal efficiency. It also offers the wonderful advantage that deformations and tolerances can be accommodated during every phase of installation by simply tightening or adjusting the rods.



Kirchberg shopping mall in Luxembourg.  
Façade of glass and steel  
Coordination and site management:  
Stefan Jeromin  
Design and consultancy:  
Robert Danz





Load transfer the easy way:  
The weight of the façade is  
transmitted via system nodes  
located directly behind the  
glass surface and RODAN  
ties to the arch trusses of  
the steel substructure.

## Cathedrals of Glass

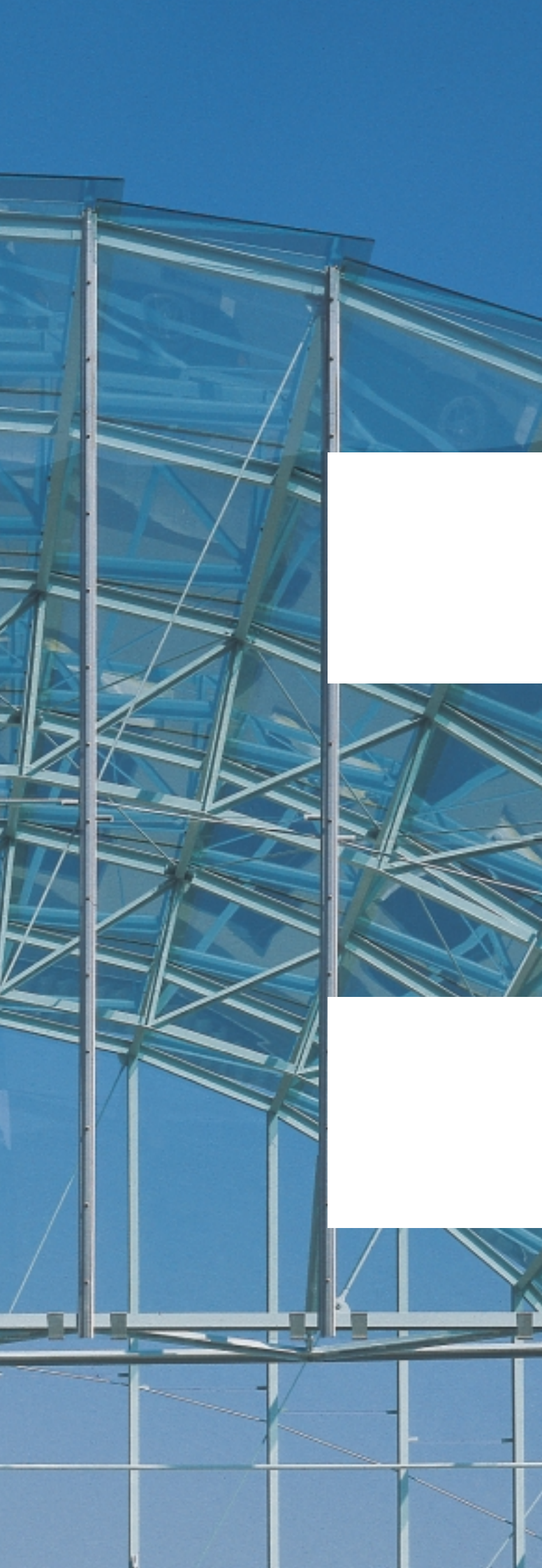
Three transparent pavilions each with a floor space measuring 100 square metres dominate the frontage of the bus terminal at Endersbach in Germany. The two outer "aisles" feature a cross vault roof, while the centre "nave" has a barrel roof. Both roof designs feature lattice work constructions to neutralise both compressive and tensile forces. The tensile components in this case are absorbed by RODAN ties in a variety of dimensions depending on their position and load level.



Bus terminal, Endersbach  
Architect:  
Winfried Maier Dipl.-Ing.,  
Grossheppach  
Design of the glass-and-steel  
construction with detail  
engineering:  
Robert Danz







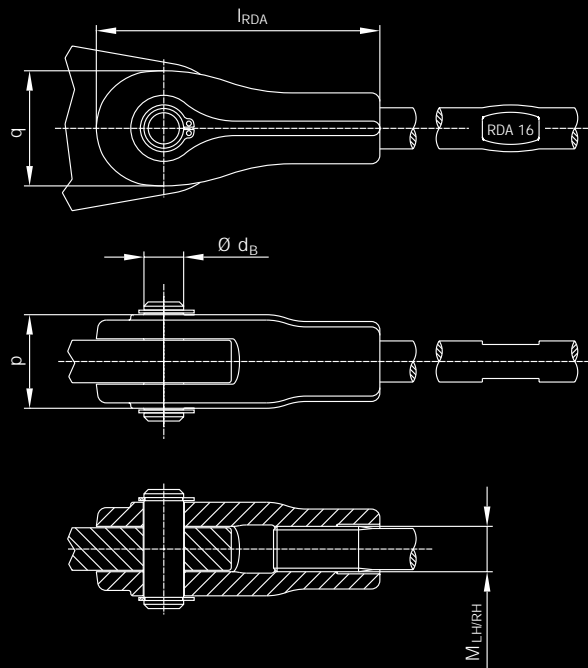
Glass arches, glass façades:  
The wind bracing of the barrel, located in the plane of the roof, and the intersecting diagonals at the eaves have been constructed using RODAN ties. The different gable walls are designed as lattice work constructions with rising and falling diagonals. The tie rods located between perform not only a structural but also an intrinsic design function.



## Dimensions and Bearing Loads

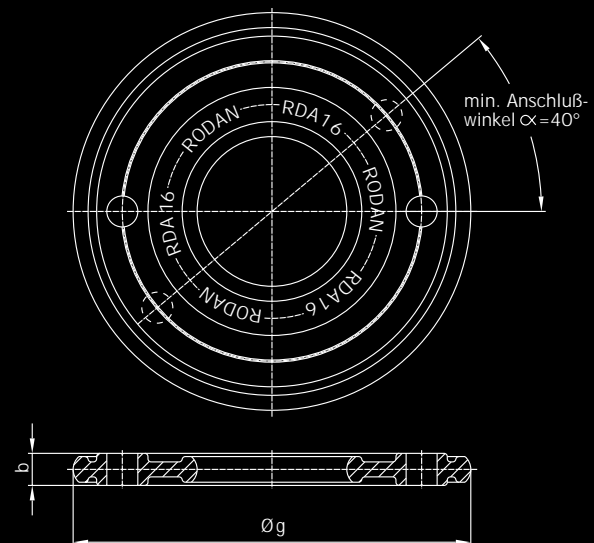
### Fork end piece · Round-section rod

$\varnothing d_B$	Pin diameter
$l_{RDA}$	Total length of the RDA fork end piece
$M_{LH/RH}$	Metric thread left-hand/right-hand
$p$	Total thickness of the RDA fork end piece
$q$	Total width of the RDA fork end piece; min. width of the eye bar



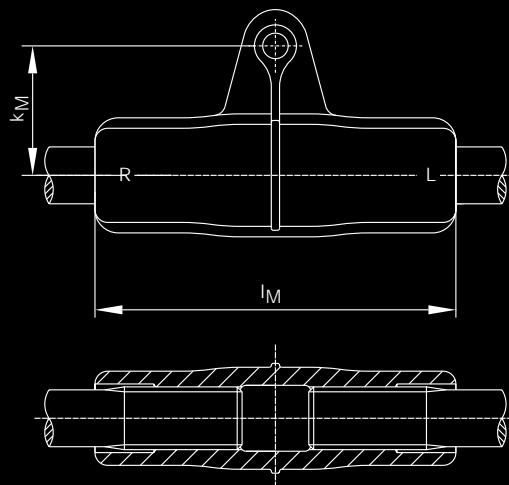
### Circular hub

$b$	Thickness of the centre ring
$\varnothing g$	Outside diameter



### Coupler

$k_M$	Distance between coupler line and pin centre line in the lug
$l_M$	Total length in the coupler



		Fork end piece							Coupler				Circular hub				Bearing load
		$l_{RDA}$	p	q	$\phi_{dB}$	$M_{LH/RH}$	S	E	$l_M$	$k_M$	S	E	b	$\phi_g$	S	E	$F_d$ [KN]
RDA	5	36,5	10	14	5	M5		×									
RDA	6	44	12	16,7	6	M6	▲	×	46	19	▲	▲	5	73	▲	▲	7,46
RDA	8	52	16	21,3	7	M8	▲	×	52	21	▲	▲	7	99	▲	▲	13,6
RDA	10	64	19,6	25,5	9	M10	×	×	60	23	▲	▲	8	120	×	▲	15
RDA	12	78	23,6	30	11	M12	×	×	75	27,5	▲	▲	10	146	×	▲	30
RDA	16	100	33	40	14	M16	×	×	92	33	×	▲	15	186	×	▲	58,2
RDA	20	122	40	49	18	M20	×	×	110	37	×	▲	18	238	×	▲	88,2
RDA	24	150	46,2	58	21	M24	×	×	138	44	×	▲	20	280	×	▲	127
RDA	27	167	50,9	64,5	24	M27	×		154	50,5	▲		22	318	×		158
RDA	30	185	57,1	71,5	26	M30	×	×	170	57,5	×	▲	25	346	×	▲	197
RDA	36	220	68	84,5	30	M36	×	×	196	72	×	▲	30	412	▲	▲	281
RDA	42	255	79,1	100	35	M42	×		218	86,5	▲		35	480	▲		384
RDA	48	290	90	116	42	M48	×		250	98,5	▲		40	558	▲		501
RDA	52	315	98,2	124	45	M52	×		275	111,5	▲		45	600	▲		588
RDA	56	341	107	134,5	50	M56	×		300	124,5	▲		50	652	▲		682
RDA	60	374	116	146	52	M60	▲		315	137	▲		55	692	▲		782

S Steel (general building approval, ETAG in preparation)

E Stainless steel (ETAG in preparation)

× available

▲ on request

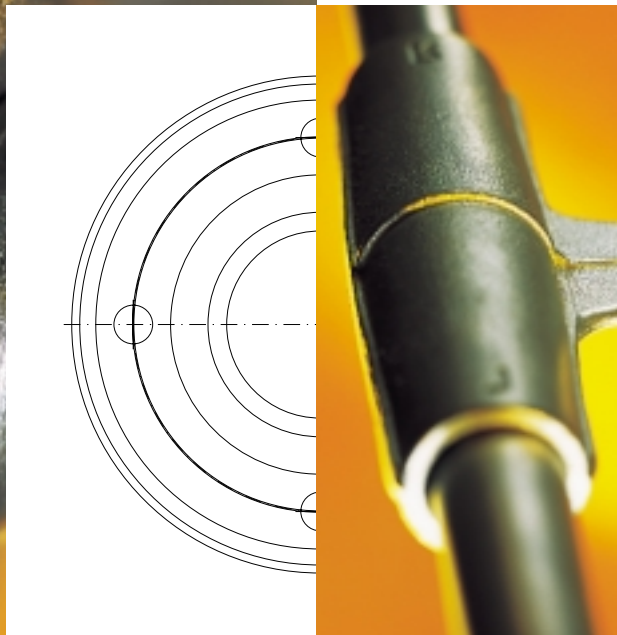
## Safety and Support – The prime criteria in architecture

High-quality constructions require close and cooperative dialogue between architect, engineer and system manufacturer. Particularly where rules, standards and guidelines are rather complex – or even yet to be formulated. In contexts such as these, products from experienced, established companies offering expertise in research and development – ideally backed up by an effective marketing and sales organisation – are essential.

The RODAN tie system is type-approved and subjected to continuous quality assurance with third-party verification. This ensures that modern, imaginative architecture also comes with the necessary safety of a proven technical solution.







The reliable transmission of tensile forces - over long distances and with no bending. RODAN ties perform this task with maximum economy and aesthetic elegance. And with all the benefits of a type-approved system.



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