

hambro

COMPOSITE FLOOR JOISTS SYSTEMS

D500™



Engineered Solutions

Engineered Service



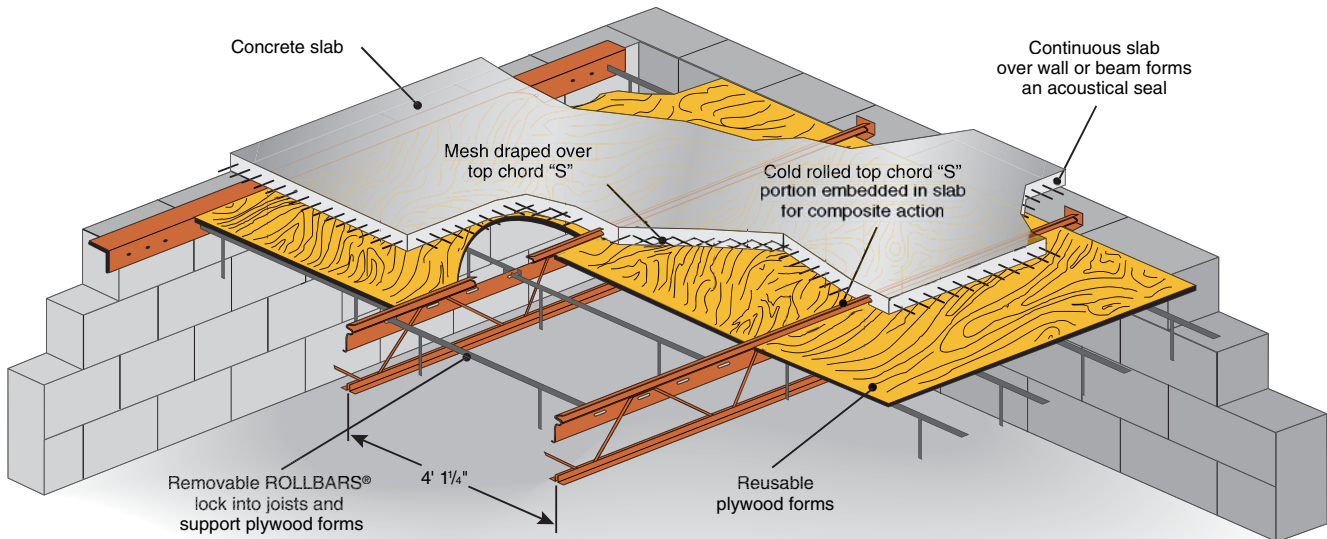
Advantages

Simplicity:	Fast and simple to install
Rigidity:	Composite design
Maximum Duct Openings:	Allows chasing of mechanical, electrical and plumbing
Fire Protection:	UL Ratings with PVC plumbing and duct openings without fire dampers
Sound Control:	STC ratings
Versatility:	Applicable to all types of framing
Service:	Fast delivery, design assistance, value engineering,
Economical:	Less concrete and reinforcing steel required, longer spans

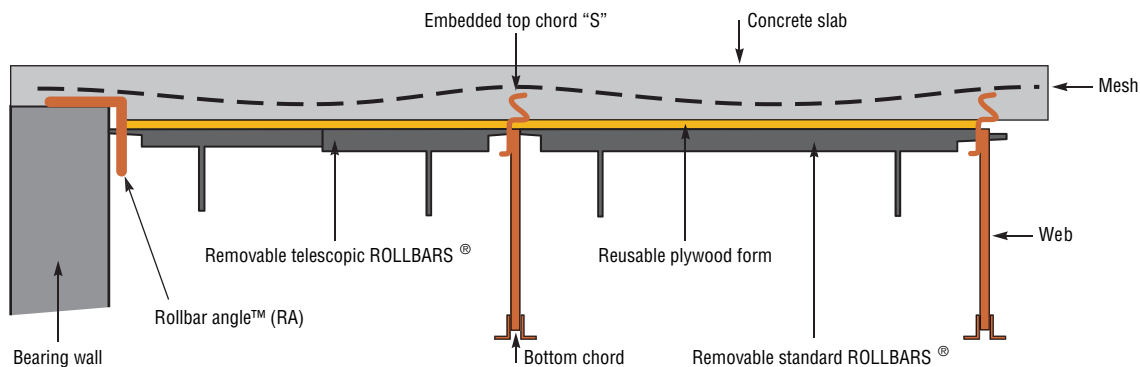
Description

The D500™ composite floor joist system is an advanced up-to-date answer to elevated floor construction challenges. Combining Hambro® steel joists with poured concrete, the system consists of hybrid concrete/steel T-beams running in one direction and an integrated continuous slab in the other (see drawing below). The bottom chord (fy 50,000 psi min.) acts as a tension member in the concreting stage and during the service life of the floor. The web system tying top and bottom chords together consists of bent rods (fy 44,000 psi min.) and resists vertical

shear in a conventional truss manner. The patented 13 gauge top chord (fy 50,000 psi min.) acts as a compression member during the non-composite stage. In the composite stage, the top chord is embedded in the concrete and functions as a continuous shear connector. The concrete slab is reinforced with welded wire mesh. The top chord functions as a high chair, developing negative moment capacity in the concrete slab which behaves as a continuous one-way reinforced slab.



Terminology



The Secret Behind a Fast and Economical Installation

1. Spreading Joists



Joists are placed on the wall or beam and spread to approximately 4' o.c. Check your load conditions and fire ratings for permissible options.

2. Placing ROLLBARS[®]



ROLLBARS are designed to support the plywood forms, the slab dead weight and a 40 psf construction load. When rotated and locked into notches in the top chord, the ROLLBARS[®] guarantee joist spacing while providing lateral and torsional stability.

3. Installing Plywood Forms



Together, the plywood and ROLLBARS[®] form a rigid diaphragm during construction, providing a platform for your workforce. The Hambro[®] system accommodates standard 4' x 8' plywood sheets. (3/8", 1/2" or 5/8" may be used.)

4. Mesh in Place



Standard 8' x 20' sheets of mesh are easily placed over the top chord "S" of the Hambro[®] joists. With the top chord "S" acting as a high chair, the mesh forms a natural catenary to reinforce and support the concrete slab.

5. Using Spanners



Temporary spanners are installed to support 1/2" or 5/8" plywood sheets. Spanners are not required when using overlapped 3/8" plywood sheets.

6. View from Below



No permanent bottom chord bridging is required. Bottom chords are fabricated with clips generally at third points to accommodate ROLLBARS[®] for temporary bracing during the concreting stage. No shoring is required unless noted.

7. Pouring Concrete



Minimum design is a 2 1/2" - 3,000 psi slab. The monolithic pour develops diaphragm action and forms an acoustical seal where the slab passes over walls. The patented top chord "S" embeds in the pour of the slab for composite action.

8. Stripping Formwork



ROLLBARS[®] and plywood forms may be stripped when the concrete reaches 500 psi, which is usually the day after the pour. The deck is ready for other trades when the concrete reaches a strength of 1,000 psi, usually within 48 hours after the pour. The formwork is easily removed for future re-use.

9. UL Fire Rated



Furring channels are tied to the bottom chord of the Hambro[®] joists. Fire rated gypsum board completes the assembly, providing an attractive continuous ceiling. See page 4 for UL ratings.

Fire Resistance Ratings

Floor/ceiling assemblies using Hambro® have been tested by independent laboratories. Fire resistance ratings have been issued by Underwriters Laboratories Inc. which cover gypsum board, acoustical tile and spray on protection systems. Reference to these published listings should be made in detailing ceiling construction. Check your UL directory for the latest updating of these listings.

UL Design No.	Rating (hr)	Slab Thickness (in.)	Ceiling	Beam Rating
G003	2	2 1/2	Suspended or panel	-
G213	2	3	Suspended or panel	2
	3	4	Suspended or panel	3
G227	2	2 1/2	Suspended or panel	3
G228	2	3 1/4	Suspended or panel	2
G229	2	3	Suspended or panel	2
	3	4	Suspended or panel	3
G524	2	2 1/2*	Gypboard 1/2	2
	3	3 1/2*	Gypboard 1/2	3
G525	3	3 1/4	Gypboard 5/8	3
G531	1	2 1/2	Gypboard 1/2	2
	2	3 1/4	Gypboard 1/2	2
G702	1-2-3	Varies*	Spray on	-
G802	1-2-3	Varies*	Spray on	-

*Note: Normal and lightweight concrete

Sound Control

The Hambro® Composite Floor Joist System has excellent acoustical properties. Independent tests in a completed apartment in accordance with ASTM-E336 as well as laboratory testing under ASTM-E90 have resulted in the Hambro® system receiving a sound transmission class (STC) of 57 which is twice as effective as a 6 in. concrete slab. These tests may vary from actual field conditions. Variations in construction practices, i.e. wood frame, CBS or steel frame construction may affect the actual field results of an independent testing company. It is the responsibility of others to "isolate" the IIC with products and materials available.

Materials	STC	IIC
Hambro D500™ Floor Joist System	57	30

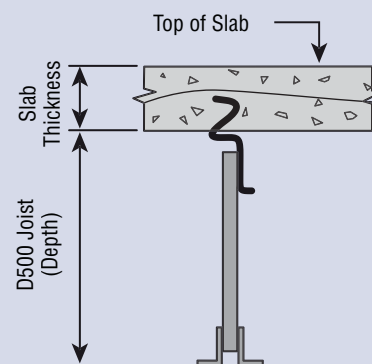
D500™ Clear Span Table

	Residential				Commercial	
Slab Thickness	2 1/2"	2 3/4"	3"	4"	3"	3 3/4"
Joist	LL=40 psf	LL=40 psf	LL=40 psf	LL=40 psf	LL=50 psf	LL=50 psf
Depth*	DL=60 psf	DL=62 psf	DL=65 psf	DL=77 psf	DL=65 psf	DL=74 psf
8"	20' - 0"	20' - 0"	20' - 0"	20' - 0"	20' - 0"	20' - 0"
10"	25' - 0"	25' - 0"	25' - 0"	23' - 8"	25' - 0"	24' - 1"
12"	29' - 0"	28' - 11"	28' - 9"	26' - 1"	28' - 9"	26' - 7"
14"	33' - 0"	32' - 3"	31' - 4"	28' - 4"	31' - 4"	29' - 0"
16"	36' - 1"	35' - 0"	33' - 11"	30' - 7"	33' - 11"	31' - 3"
18"	38' - 10"	37' - 5"	36' - 3"	32' - 7"	36' - 3"	33' - 4"
20"	41' - 4"	39' - 11"	38' - 8"	34' - 8"	38' - 8"	35' - 6"
22"	43' - 0"	42' - 4"	40' - 10"	36' - 6"	40' - 10"	37' - 5"
24"	43' - 0"	43' - 0"	43' - 0"	38' - 5"	43' - 0"	39' - 5"

* Total floor depth = D500™ Joist depth plus slab thickness

Notes:

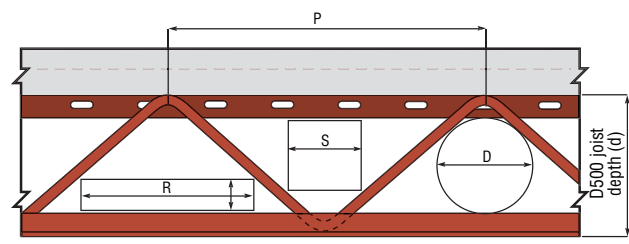
- Minimum slab thickness = 2 1/2"
- Minimum top chord cover = 1"
- f' c = 3000 psi, Fy = 50 ksi
- Table reflects uniform loads only.
- Standard spacing is 4' - 1 1/4"
- Live load deflection design standard: L/360
- Design clear spans, other than those shown in the above table, require additional structural review.



NOTE

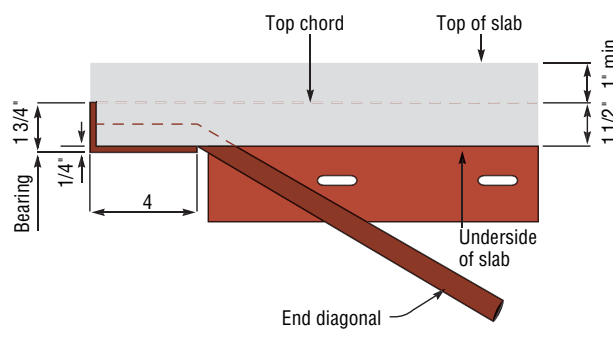
The information provided here with is for general information about Hambro® products and, is subject to change without notice for updates and improvements. Hambro® does not accept responsibility for improper use of this information.

Maximum Duct Openings



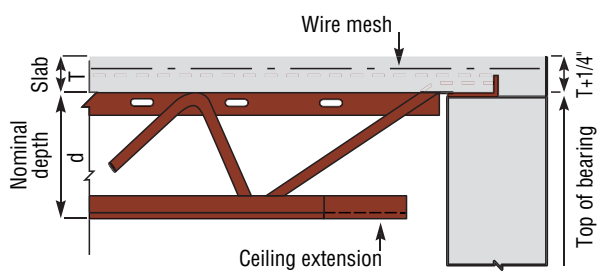
d	P	D	S	R
8"	20"	4"	4"	6" X 3"
10"	20"	6"	5"	7" X 4"
12"	24"	8"	6"	9" X 5"
14"	24"	9"	7"	11" X 5"
16"	24"	10"	8"	13" X 5"
18"	24"	11"	8 1/2"	12 1/2" X 6"
20"	24"	11 1/2"	9"	13" X 6"
22"	24"	12"	9 1/2"	14" X 6"
24"	24"	12 1/2"	10"	14" X 7"

Standard Shoe*

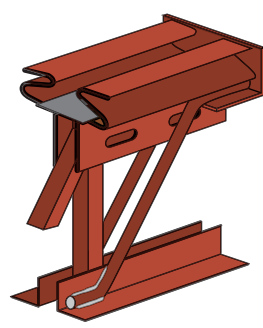


*All dimensions are approximate

Typical Bearing Detail

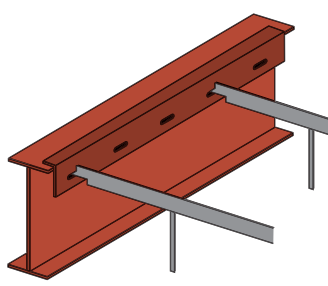


Additional Systems and Accessories



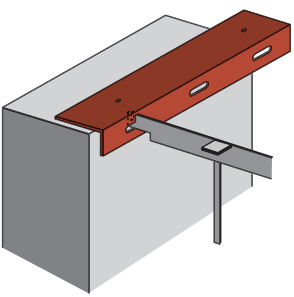
LH Series

This series features a top chord "S" made of two Hambro® sections. Hambro® composite long span floors provide greater economy for heavy service loads and longer spans. Joist depths range from 20" to 36" with spans up to 53'. Details are available from your Hambro® representative.



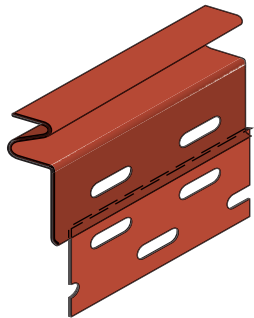
Rollbar Angle (RA) on Steel Beam

This Hambro® accessory is designed to be field attached to the top flange of a steel beam running parallel to a Hambro® joist. Rollbar Angle (RA) is slotted similar to the Hambro® top chord "S" to accommodate ROLLBARS®.



RA on Walls

This Hambro® accessory is fastened at the top of walls and is slotted similar to the Hambro® top chord "S" to accommodate ROLLBARS®.



Hanger Plate

Shop attached slotted plate for thicker slab areas.



The design flexibility of the Hambro® system satisfies the needs of any type of construction. It has been used for masonry or steel-frame buildings; poured or pre-cast concrete walls, as well as wood or metal frame construction. Hambro® has been used successfully in single-family detached houses, multi-storied residential complexes and commercial buildings.



Office Buildings



Mashareq Tower / Riyadh



Safwa Tower / Makkah

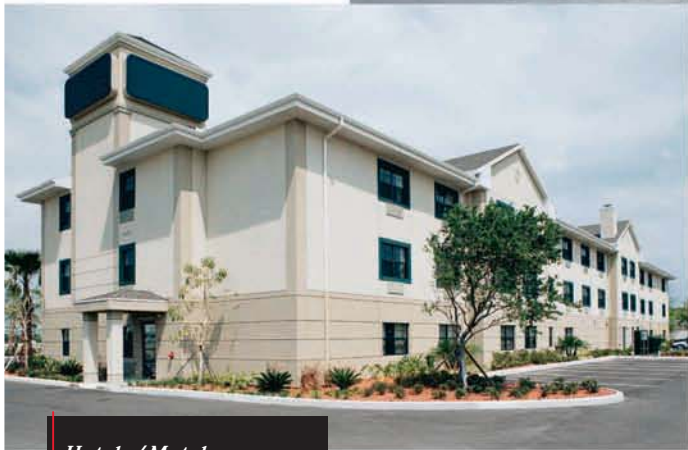


Hambro, Sharjah, / UAE.



Onaiza Mall / Riyadh

*Apartments /
Condominiums*



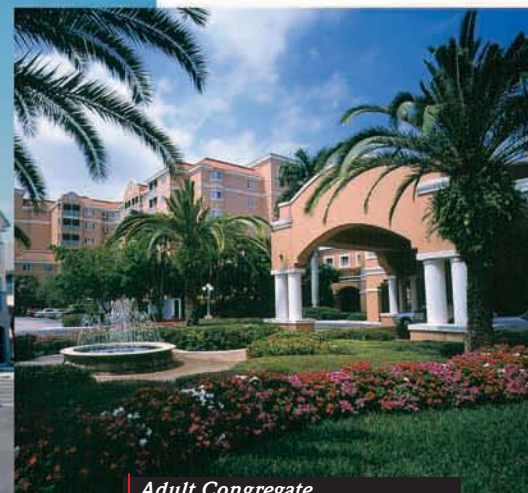
Hotels / Motels



*Apartments/Condominiums
Mid Rise*



*Apartments /
Condominiums*



*Adult Congregate
Living Facilities*

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