



INSTALLATION **MANUAL** **D500**



CANAM
HAMBRO®

This manual is intended to serve as a basic guide for the installation of Canam's Hambro D500™ composite floor system and must be used in combination with the installation drawings that have been issued for construction and provided by your Hambro® supplier. Please contact the supplier should you come across any contradictions or ambiguities in these documents.

The execution of the instructions contained in this manual is the responsibility of the user and must be performed in compliance with current building codes and safety standards.

TABLE OF CONTENTS

OVERVIEW.....	6
HAMBRO D500 COMPOSITE FLOOR SYSTEM	10
HANDLING AND STORAGE.....	12
INSTALLATION.....	14
TYPES OF ROLLBARS AND ACCESSORIES	22
INSTALLATION OF THE FORMWORK SYSTEM AND TEMPORARY BRIDGING	28
CONCRETING STAGE.....	34
REMOVAL OF PLYWOOD FORMS.....	40



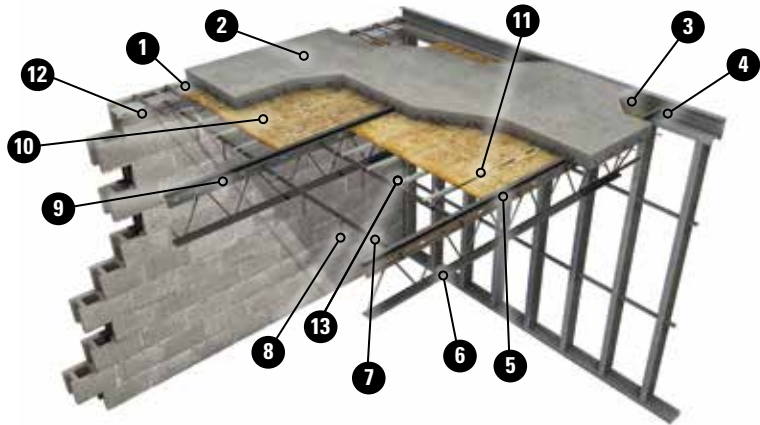


Canam is fully committed to ensuring risk management and safety on its construction sites, and provides its customers with reference documents and tools to ensure that operations are as safe as possible and to increase project efficiency.

Contact your Canam project manager for customized support.

OVERVIEW





OVERVIEW

1. Welded wire mesh draped over joists.
2. Concrete slab.
3. Wall supporting the joists.
4. Joist shoe.
5. Cold-rolled top chord “ Σ ” portion embedded 1½ in. (38 mm) in the concrete slab to achieve composite action.
6. Rollbar® clips for temporary bottom chord bridging.
7. Rollbars (rotated into a locked position in the joist) to support plywood forms.
8. Rollbar handle.
9. Slots in top chord to support Rollbars (chord cut for drawing clarity).
10. Reusable 4 ft. x 8 ft. (1,220 mm x 2,440 mm) plywood forms.
11. Minimum width of plywood forms is 1 ft. (305 mm), cut parallel to the grain direction.
12. Flange hanger (FH, MH).
13. Interior supports.

Note: Plywood forms are removed after rotating and removing the Rollbars.

**HAMBRO
D500 COMPOSITE
FLOOR SYSTEM**

HAMBRO D500 COMPOSITE FLOOR SYSTEM

GENERAL NOTES

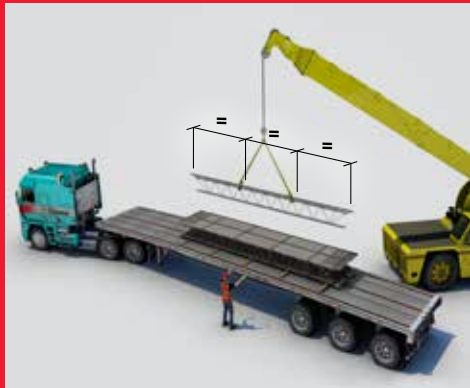
Canam is a material supplier only, and as such, does not perform work on site and is not responsible for the field work, including installation. This manual is provided as an aid to installation. Deviation from the installation manual shall release Canam from all liability relating to the material. Canam assumes no liability for installation or handling of the material on the jobsite. Site conditions may differ. Consult the engineer of record for approval of and direction on the installation procedures.

Any changes to the issued for construction plans that may be required due to jobsite conditions must be reviewed and accepted by Canam.

The nominal spacing of Hambro D500 composite joists is 4 ft.-1¼ in. (1,251 mm). Refer to the installation drawings specific to each project.

The Hambro D500 composite floor system must be installed in compliance with the issued for construction drawings and the instructions in the Canam installation manual.

HANDLING AND STORAGE



HANDLING AND STORAGE

HOISTING

When the joists are hoisted using a crane, the steel choker must be placed at third points along the top chord. Never attach the cables to the web members.

STORAGE

Hambro joists must be stored lengthwise on a level surface. To prevent damage, joists should not be stacked.

DAMAGED JOISTS

Care should be taken at all times to avoid damaging the joists through careless handling during unloading, storage and/or installation. Note that damaged joists may impair the performance and safety of the system.

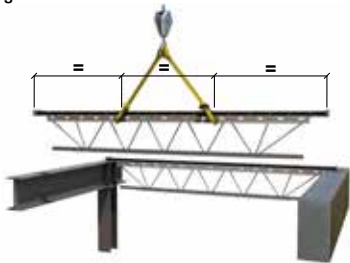
All damage must be reported to the project manager who will make the necessary recommendations.

DO NOT MAKE FIELD REPAIRS TO DAMAGED HAMBRO JOISTS WITHOUT WRITTEN AUTHORIZATION FROM THE CANAM ENGINEER OF RECORD.

INSTALLATION

1 - POSITIONING OF JOISTS

The joists are placed on the walls or beams and positioned in compliance with the shop drawings issued for construction by Canam. The anchorage of joist ends are also shown on the Canam erection drawings.



2 - ROLLBARS

The Rollbars are designed to support the plywood forms, concrete and a 50 psf (2.4 kPa) construction load. When rotated and locked into the notches in the top chord, the Rollbars lock the joists in place while providing lateral and torsional stability.



3 - PLYWOOD FORMS

Together, the plywood and the Rollbars form a rigid diaphragm during construction, providing a safe platform for workers. The Hambro system uses standard 4 ft. x 8 ft. x ½ in.* (1,200 mm x 2,400 mm x 13 mm*) plywood sheets.

** Subject to change: review erection drawings.*



4 - SHEETS OF MESH

Welded wire mesh serves as the standard catenary for the slab. Standard 8 ft. x 20 ft. (2,400 mm x 6,100 mm) sheets of mesh are easily placed over the top chords of the Hambro joists. The top chord acts as a highchair. (Consult the installation drawings issued for construction for quantities, if required.)



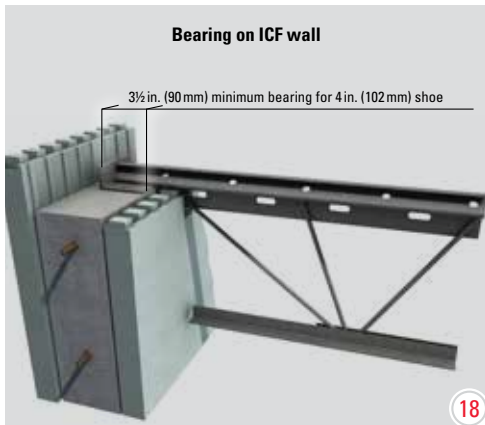
5 - TEMPORARY BRIDGING

Bottom chords are fabricated with clips to accommodate Rollbars for temporary bridging during the pouring stage. Generally, no permanent bridging neither shoring are required unless specifically noted. (Consult the installation drawings for details.)



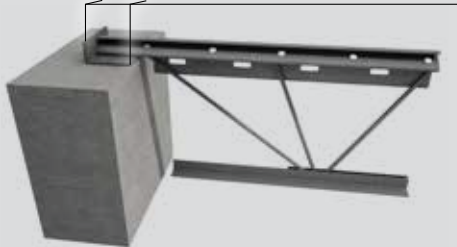
STANDARD JOIST SHOE BEARING

The standard joist shoe bearing is determined according to the load-bearing elements. Refer to the issued for construction installation drawings for sectional views and details.



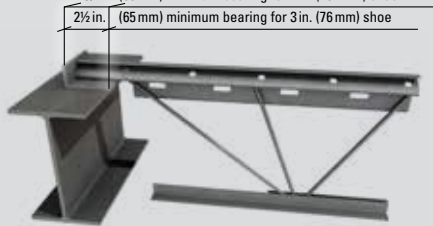
Bearing on concrete, masonry or wood walls

3½ in. (90 mm) minimum bearing for 4 in. (102 mm) shoe



Bearing on steel beams or light gauge walls

3½ in. (90 mm) minimum bearing for 4 in. (102 mm) shoe
2½ in. (65 mm) minimum bearing for 3 in. (76 mm) shoe



SPACING FOR ROLLBARS

In order to support the forms adequately, the Rollbars should be spaced at the intervals indicated on the installation drawings. There must be a minimum of one (1) Rollbar at 7 in. (178 mm) from the end of each plywood form and for each sheet joint, there must be at least four (4) interior supports for a standard joist spacing of 4 ft.-1¼ in. (1,251 mm).

Whenever possible, it is recommended that Rollbars be staggered from bay to bay so that only one Rollbar end is in each slot. This will simplify the stripping procedure. This does not apply to temporary bottom chord bridging or to the first Rollbar nearest the load-bearing wall or beam.

THICKENED SLABS

Hanger plates allow for the addition of an increased layer of thickness to the slab (see the table below for thickness).

inch	mm
2	51
3	76
5	127
6	152

Note: Refer to the details provided on the installation drawings for the total thickness of the slab and the location of the added layers.

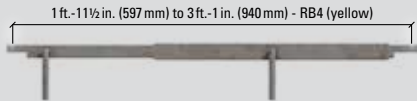


TYPES OF ROLLBARS AND ACCESSORIES

STANDARD ROLLBAR



TELESCOPIC ROLLBAR No. 4



TELESCOPIC ROLLBAR N°. 5



EDGE-FORMING ROLLBAR



INTERIOR SUPPORT

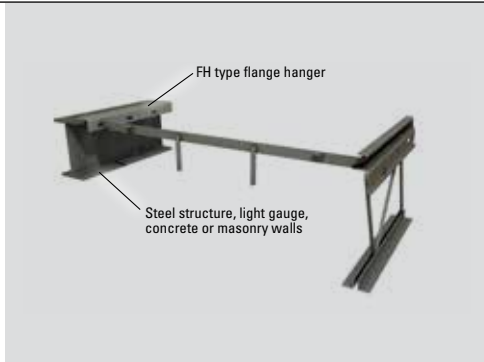
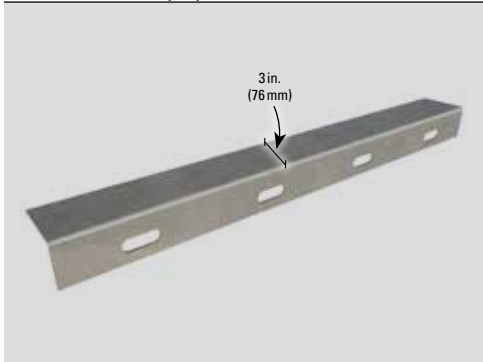


Used to support plywood joints.

ROLLBAR RACK

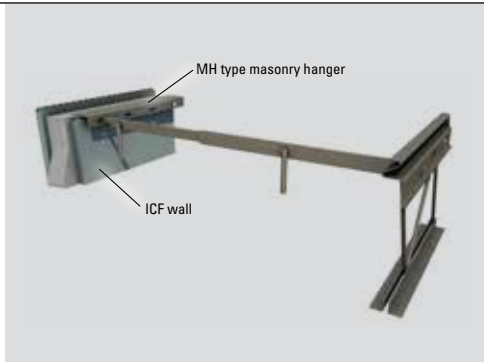
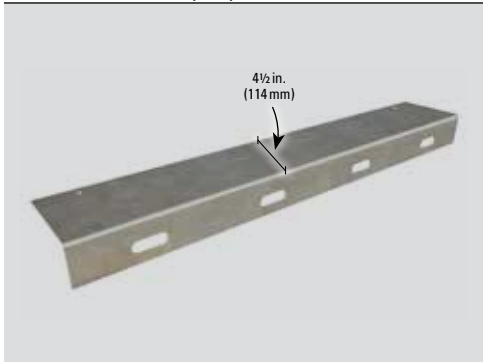


FLANGE HANGER (FH)



Used with walls made of light gauge steel stud, concrete, wood, masonry or with a beam.

MASONRY HANGER (MH)



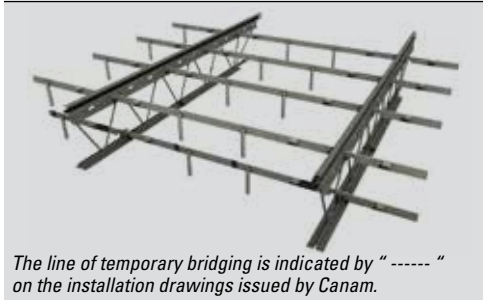
Only used on an insulated concrete wall unless specified otherwise on the installation drawings.

INSTALLATION OF THE FORMWORK SYSTEM AND TEMPORARY BRIDGING

INSTALLATION OF THE FORMWORK SYSTEM AND TEMPORARY BRIDGING

STANDARD SPACING OF 2 ft.-1¼ in. (641 mm), 4 ft.-1¼ in. (1,251 mm) OR 5 ft.-1¼ in. (1,556 mm)


TEMPORARY BRIDGINGS BETWEEN TWO JOISTS



NON-STANDARD SPACING

TEMPORARY CROSS BRIDGINGS BETWEEN TWO JOISTS



The line of temporary cross bridging is indicated by “” on the installation drawings issued by Canam.

FORMS ON CANTILEVER SLABS



This system is applicable to cantilever slabs ≤ 1 ft.- $2\frac{3}{4}$ in. (375 mm). For cantilever slabs > 1 ft.- $2\frac{3}{4}$ in. (375 mm), the system must be stabilized; refer to the recommendations of the consulting engineer.

FORMWORK SYSTEM *(If polythene is used.)*



A sheet of polythene can be placed directly over the plywood in order to protect it and facilitate removal afterwards. The polythene should never cover the joist or the top chord. No materials whatsoever should cover the top chord so as not to impact the joist's composite action.



Do not overload the slab or joists during construction with materials such as palettes of cement blocks, dry stone walls, sand, etc.



Never use pieces of plywood to complete the forms as this could compromise worksite safety.

PRECAUTIONS

1. Before any loads are applied or the forms are put in place, at least three (3) joists must be installed with all the required Rollbars in order to ensure the structural capacity of the Hambro joists.
2. Full sheets of plywood are recommended. When shorter pieces are used, make sure that they are adequately supported and do not present a safety risk for workers and construction loads.
3. Bundles of plywood should be placed on supporting walls or beams, never on the joist system. The system is not designed for this purpose and can compromise worksite safety.

CONCRETE STAGE

SAFETY PRECAUTIONS BEFORE AND DURING POURING CONCRETE

1. Prior to the pour, check all Rollbars to ensure that they remain in the proper position.
2. Reduce the Rollbar spacing if the slab thickness is greater than 4 in. (102 mm), as indicated on the issued for construction installation drawings.
3. Prior to and during the pour, ensure that the plywood forms do not overlap*, are properly butted and have not shifted laterally into the top chord.
4. Do not impose construction loads that are superior to the admissible loads indicated on the installation drawings, as the performance and safety of the system could be compromised.
5. Do not pour concrete in excess of the slab thickness specified on the drawings and do not pour large quantities of concrete in a single area without spreading it out simultaneously.
6. Make sure that there are no workers below the slab during the pour.
7. Rollbars are not designed to support the weight of a wheelbarrow. It is therefore recommended that walkways be placed on the top chord using 2 in. x 12 in. (51 mm x 305 mm) wood planks positioned perpendicularly to the top chord.

** For projects in the United States or special applications, please consult the installation drawings or contact the project manager.*

CONCRETING STAGE

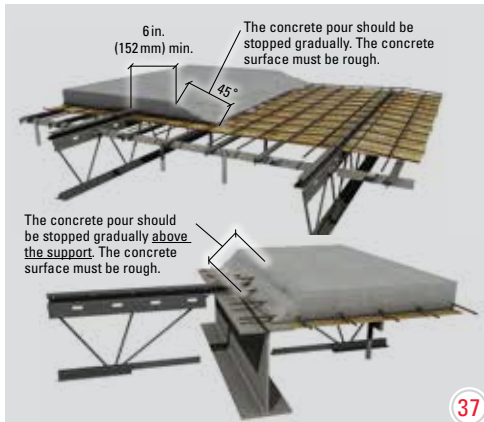
- The use of a laser or a theodolite to level the concrete is not recommended as an accumulation of concrete could occur due to the deflection of the joists.
- Always start pouring the concrete in the middle section of the joists, never at the extremities.
- During the pour, the forms will camber under the weight of the concrete. If a fixed reference point is used to measure the thickness of the slab, it will not be reliable because the formwork system itself is not fixed. The reference used to measure the slab thickness should be that of the formwork located nearest to the joists.
- When pouring the concrete, maintain the required slab thickness in all areas.
- A light vibration should be applied to the concrete during the pour to ensure that the top chord is thoroughly coated.

PARALLEL CONSTRUCTION JOINTS

When pouring and finishing a Hambro floor, it is not necessary to complete the entire deck in a single pour. Should it become necessary to stop the pour parallel to the joists, the joint should be midway between the joists, but never less than 6 in. (152 mm) from the top chord.

PERPENDICULAR CONSTRUCTION JOINTS

Construction joints perpendicular to the joists should be made over the load-bearing wall or needle beam but never over the joists as this could counteract the design. The pour must be stopped gradually over the support and the surface of the concrete must be left rough.



PLACING

When placing the concrete, maintain a minimum depth of 1 in. (25 mm) above the top chord for a nominal 2¾ in. (70 mm) slab. The joists are fabricated with a positive camber to offset the deflection caused by the weight of the concrete.

FINISHING AND CURING

During the curing phase, temperature and moisture conditions must be within the limits specified in standard CAN/CSA A23.3 for projects in Canada, standard ACI-318 for projects in the U.S., and editions that are in force.

The maximum weight of the equipment used to pour and polish the concrete should be less or equal to 600 lb (275 kg), excluding the operator. Validate this reference weight with the Canam engineer.





REMOVAL OF PLYWOOD FORMS



REMOVAL OF PLYWOOD FORMS

When the concrete attains a cylinder strength of 500 psi (3.5 MPa), the Rollbars and plywood forms can be removed. When the concrete attains a cylinder strength of 1,000 psi (7 MPa), the floor is ready but do not surpass the admissible loads indicated for the specified capacity. Please contact the Canam engineer to validate the admissible loads. (see tables **Formwork Removal According to Weather Conditions**).

Avoid dropping Rollbars on the slab as this may damage the concrete surface.

Rollbars should be replaced in their respective racks according to type and stored in an area where they can easily be hoisted by crane.



FORMWORK REMOVAL ACCORDING TO WEATHER CONDITIONS

The following tables present the minimum amount of time required or the minimum compressive strength that the concrete must reach before the formwork can be removed.

Normal temperature between 40°F and 80°F (5°C and 27°C)	Compressive strength	Hours after the pour
Formwork removal	500 psi (3.5 MPa)*	24 hours*
Ready for use	1,000 psi (7 MPa)*	48 hours*

** Respecting the standards of the concrete supplier, according to the product's composition and the pour conditions, and in compliance with the strength-gain curve of the concrete over time.*

Temperature over 80°F (27°C): apply standard CAN/CSA A23.3 for Canada or ACI-318 for the U.S., and editions that are in force.

Winter temperature under 40°F (5°C)	Constant temperature	Compressive strength	Minimum hours after placement
Removal of plywood forms		500 psi (3.5 MPa)	48 hours with heating
Heating ¹ after placement and insulation ²	Between 50°F and 95°F (10°C and 35°C)	1,000 psi (7 MPa)	72 hours

1. Following 72 hours of heating, the concrete must be kept at a minimum temperature of 25°F (3°C).
2. Protection against the cold (insulation or shelter) should be removed gradually to prevent cracking due to a sudden change in temperature.



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