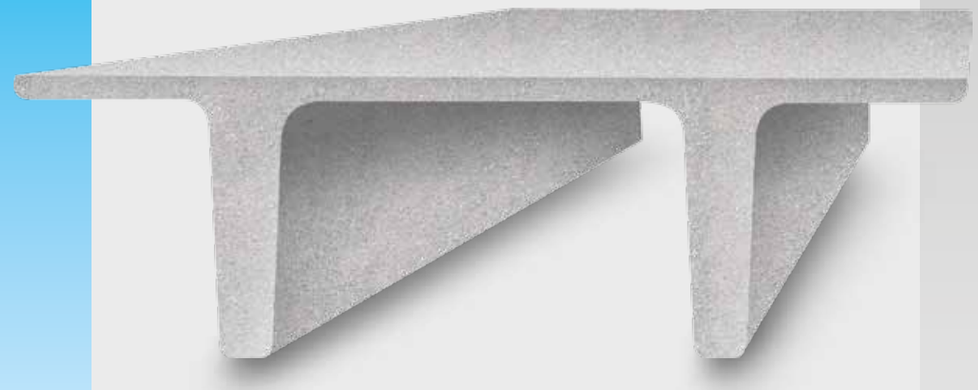
نظام البلاطات المزدوجة
Double Tee Slab System



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ALRASHID - ABETONG الراشد - أيه بيتونج

INTRODUCTION

مـــقـــدمـــة

AlRashid Abetong Co. was established in 1977 as a Saudi – Swedish Company and has grown rapidly to become the largest and most successful precast concrete company in the Kingdom of Saudi Arabia.

The company has the full range of the Precast Concrete Products like: Hollowcore Slabs (HCS), Double Tee Slabs (DTS), Form Slabs (FS), Solid Slabs (SS), Coloumns, Beams, External and Internal Wall Panels and all types of precast concrete structures in addition to the unique Swede Beam System (SBS).

AlRashid Abetong Co. has Five large factories located in the Industrial City in Riyadh and one factory located in Jizan. We serve our customers through our main office in Riyadh and our two branch offices situated in Jeddah and AlKhobar.

AlRashid Abetong Co. is well Known for its superior quality of precast concrete products, reliable professional services and commitment to fulfilling the expectations of clients.

تأسست **شركة الراشد أيه بيتونج** في عام ١٩٧٧ كشراكة سعودية – سويدية وتوسعت أعمالها بسرعة لتصبح إحدى أكبر وأنجح شركات الخرسانة المسبقة الصنع في المملكة.

الشركة تقوم بإنتاج جميع العناصر الخرسانية المسبقة الصنع مثل:
البلاطات المفرغة، ونظام البلاطات المزدوجة، وبلاطات آرا فورم سلاب، والأعمدة، والكمرات، والجدران الخارجية والداخلية، وجميع العناصر الانشائية بالاضافة إلى النظام الفريد الخاص بالشركة (نظام الكمرات السويدية)

شركة الراشد أيه بيتونج لديها خمسة مصانع كبيرة في المدينة الصناعية في الرياض بالإضافة إلى مصنع ضخم يقع في مدينة جيزان. ونقوم بخدمة العملاء من خلال مكتبنا الرئيسي في الرياض وفروع الشركة في جدة والخبر.

شركة الراشد أيه بيتونج معروفة بتفوقها الكبير في جودة المنتجات الخرسانية المسبقة الصنع بالاضافة إلى الحرص الشديد على كسب ثقة العملاء وتحقيق توقعاتهم.

DOUBLE TEE SLAB (DT) SYSTEM

GENERAL

The Double Tee (DT) slab is two symmetrically placed beams interacting with a slab forming one section with a "double tee' shape. It is made in precast, prestressed concrete and it is primarily used for floor or roof deck systems.

Double Tee slabs are made with G50 concrete and 1/2" strands, ASTM A416 as standard. Each Double Tee slab is normally 2400 wide (2396)mm + 4mm joint). The span can vary from 10m to 25m depending on required load capacity.

Flange thickness is 50mm as standard and the slab is normally combined with a screed for levelling and (in most cases) structural purpose.

The self weight for the slab is relatively low compared to the load bearing capacity.

Holes and openings can be arranged as per instructions later in this folder.

ADVANTAGES DOUBLE TEE SLAB (DT) SYSTEM

Structurally, Double Tee slabs provide the general effeciency of prestressed members concerning load capacity, span range and deflection control.

Double Tee slabs (sometimes in interaction with structural screed) are suitable for floors with high and/or concentrated loads.

DESIGN

A floor consisting of Double Tee slabs can be designed to provide a rigid and homogenous part of the structure (diaphragm). This diaphragm can be used as part of the stabilizing system and is achieved by welding the slabs together (see instructions about shear forces in joints). Structural screed can also be used for stability purpose. This design is done by the party who is responsible for the general stability of the building.

Each single element is designed to carry loads according to specifications and standards. This is normally done by AlRashid-Abetong design department. If there is a need for structural screed to act together with the slab for vertical load bearing this will be advised by AlRashid-Abetong designer.

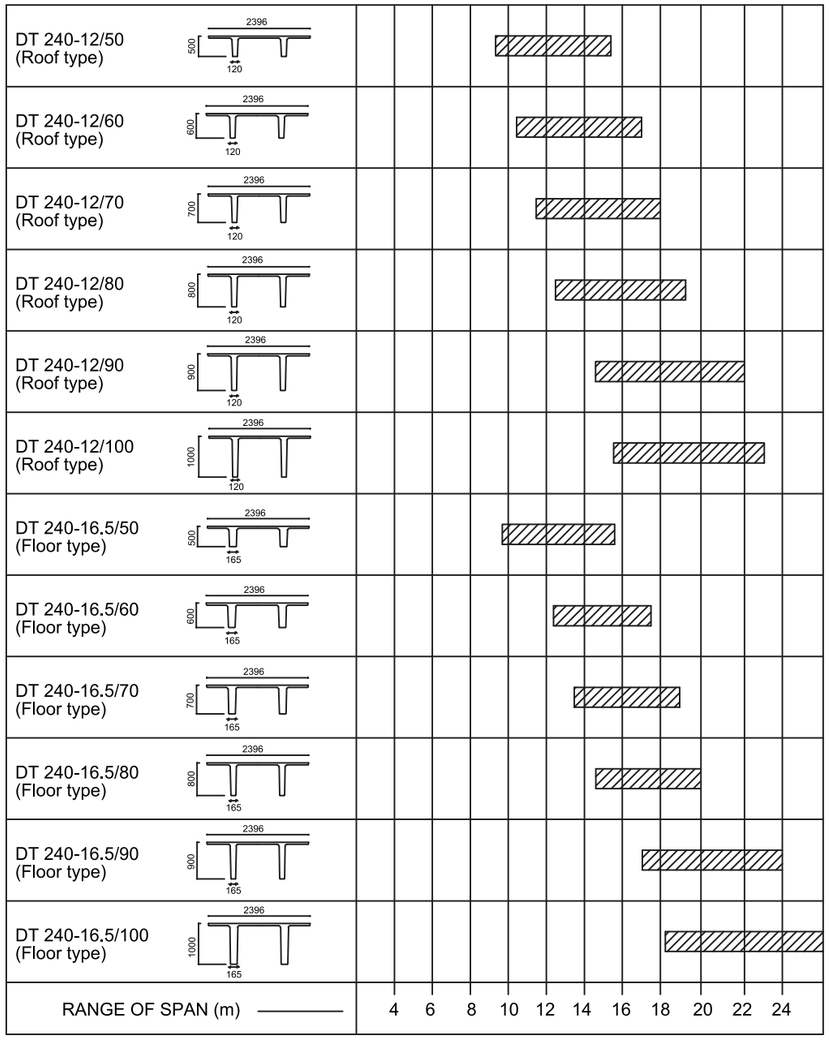
Topping for levelling purpose is needed to level the slab considering camber and tolerances.

This folder contains some general design information as load capacities, camber, weight, etc. If there is a need for more detailed or sophisticated analysis, AlRashid-Abetong design department will always be at your service.

RANGE OF SPAN

The Table shows the normal range of span for each size of Double Tee Slabs. The shorter span can carry heavy loads while the longer range is applicable for lighter loads (like roof loads etc).

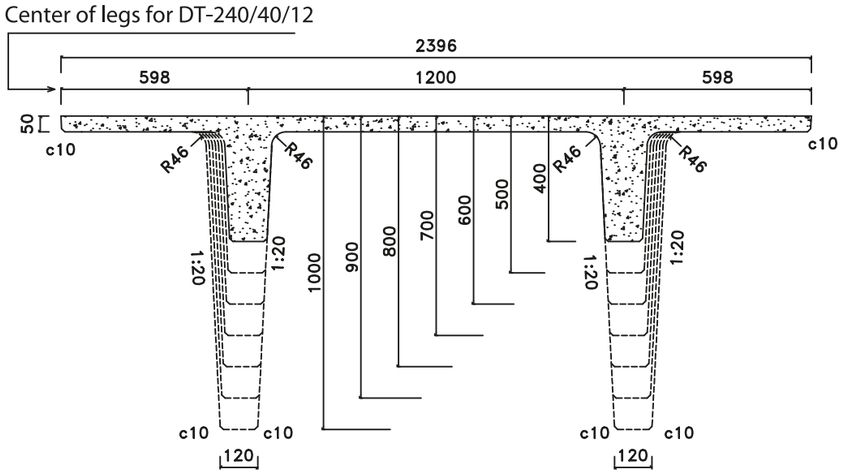
The naming "roof type" / "floor type" is only an indication of the most frequent use for each type of slab.

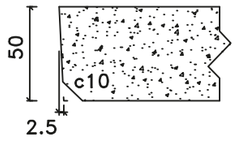


Later in this folder there is more comprehensive design information about load capacities, camber, weight, etc. If there is need for even more detailed or sophisticated analysis, AlRashid-Abetong design department will always be at your service.

TECHNICAL INFORMATION (1)

GEOMETRICAL PROPERTIES FOR SLABS WITH 120mm LEG (ROOF-TYPE)





Edge Detail flange

OTHER TECHNICAL PROPERTIES

DOUBLE TEE TYPE	WEIGHT (kN/m^2)
DT 240 - 12/40	2.21
DT 240 - 12/50	2.53
DT 240 - 12/60	2.88
DT 240 - 12/70	3.25
DT 240 - 12/80	3.64
DT 240 - 12/90	4.05
DT 240 - 12/100	4.47

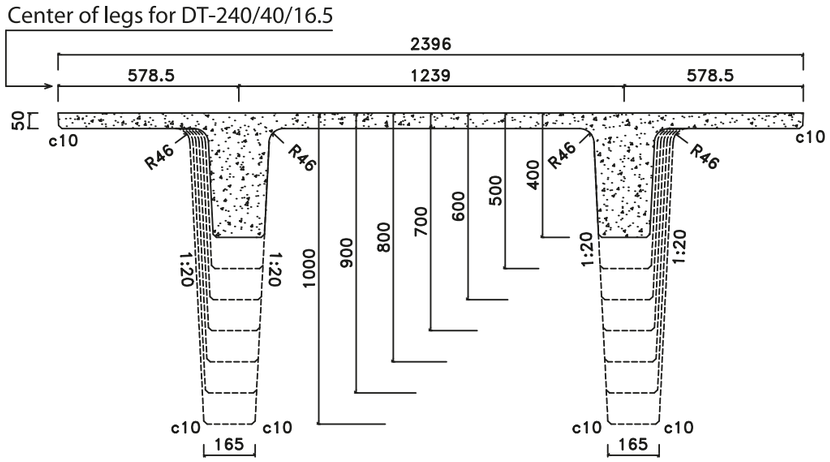
Length of elements is specified in load / camber curves in this folder. Curves are given for a selection of sizes and strand patterns as per above.

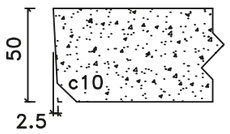
Double Tee Slabs are fabricated with G50 concrete and 1/2" strands, ASTM A416, (as standard).

Fire Rating ; Elements can normally resist minimum 60 min fire within the load/span range shown in load curves in this folder if there is a need for higher fire rating , this can be calculated from case to case , by our design department.

TECHNICAL INFORMATION (2)

GEOMETRICAL PROPERTIES FOR SLABS WITH 165mm LEG (ROOF-TYPE)





Edge Detail flange

OTHER TECHNICAL PROPERTIES

DOUBLE TEE TYPE	WEIGHT (kN/m^2)
DT 240 - 16.5/40	2.53
DT 240 - 16.5/50	2.95
DT 240 - 16.5/60	3.39
DT 240 - 16.5/70	3.85
DT 240 - 16.5/80	4.33
DT 240 - 16.5/90	4.83
DT 240 - 16.5/100	5.35

Length of elements is specified in load / camber curves in this folder. Curves are given for a selection of sizes and strand patterns as per above.

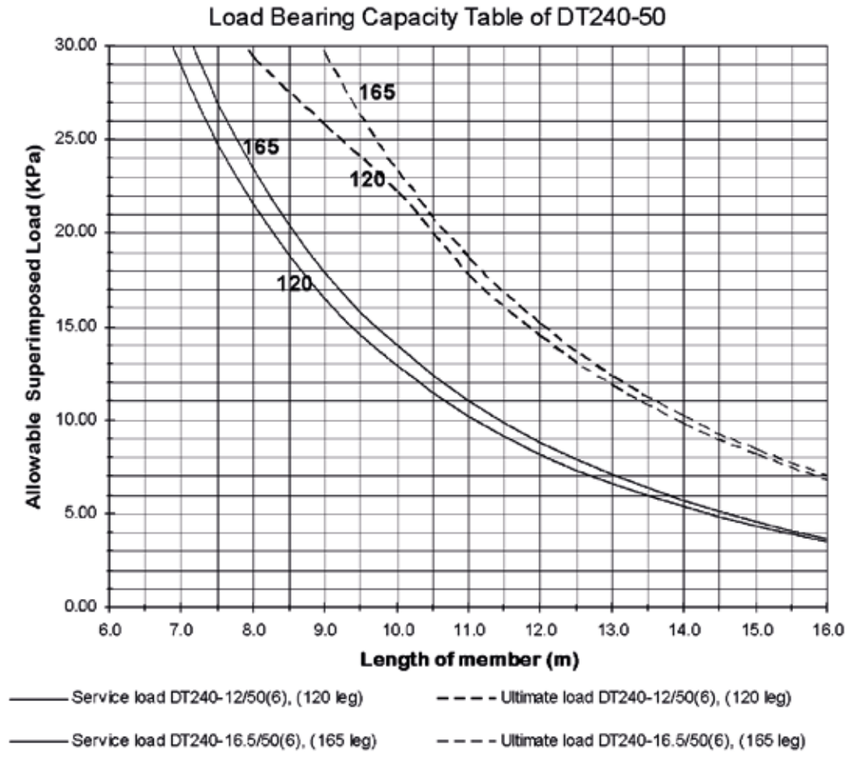
Double Tee Slabs are fabricated with G50 concrete and 1/2" strands, ASTM A416, (as standard).

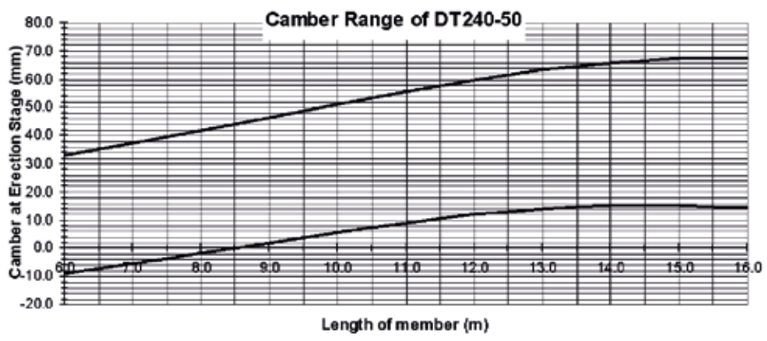
Fire Rating ; Elements can normally resist minimum 60 min fire within the load / span range shown in load curves in this folder. See previous page.

DOUBLE TEE HEIGHT 500mm

Load curves are given for maximum capacity at 120mm and 165mm leg width. Capacities are given for service load (unfactored) and ultimate load (factored). Self weight is already included in capacities.

Camber is shown for erection stage (prestressing and self-weight are considered). The two curves are showing the expected camber for highest and lowest reinforcement alternative.

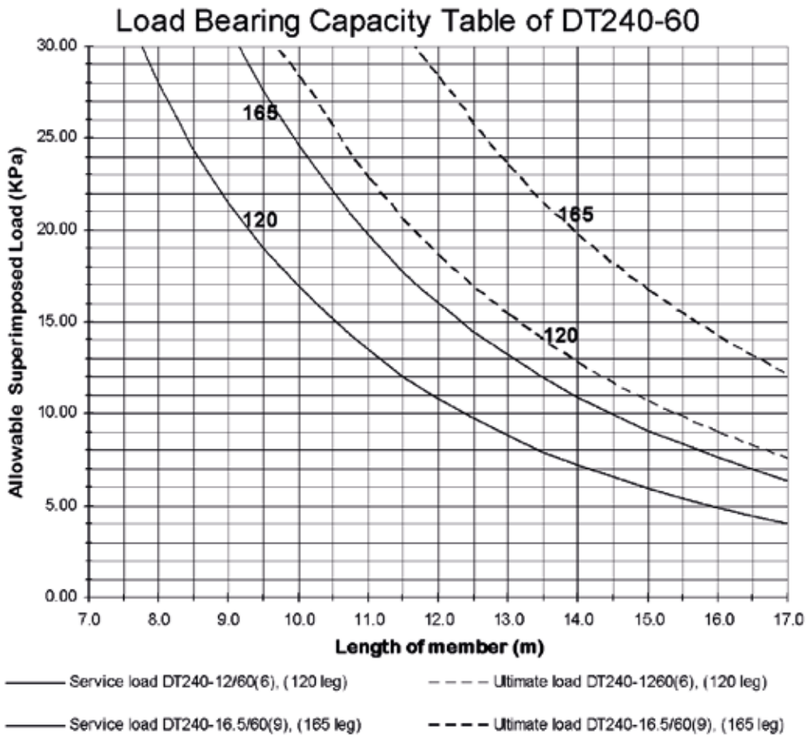


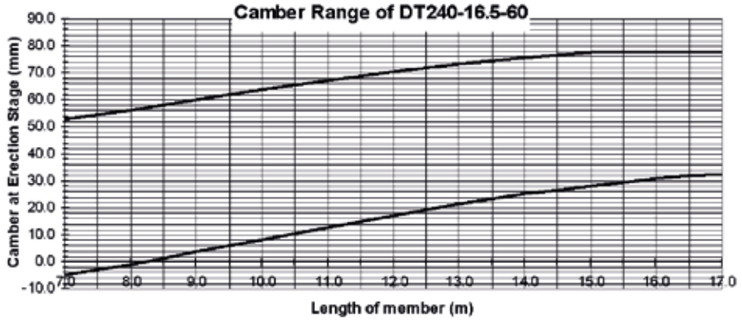


DOUBLE TEE HEIGHT 600mm

Load curves are given for maximum capacity at 120mm and 165mm leg width. Capacities are given for service load (unfactored) and ultimate load (factored). Self weight is already included in capacities.

Camber is shown for erection stage (prestressing and self-weight are considered). The two curves are showing the expected camber for highest and lowest reinforcement alternative.

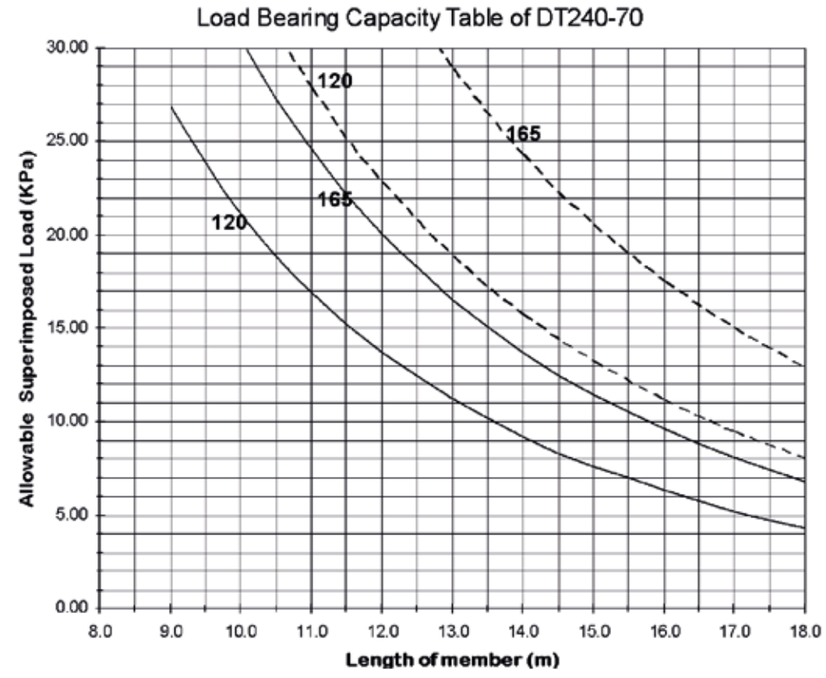


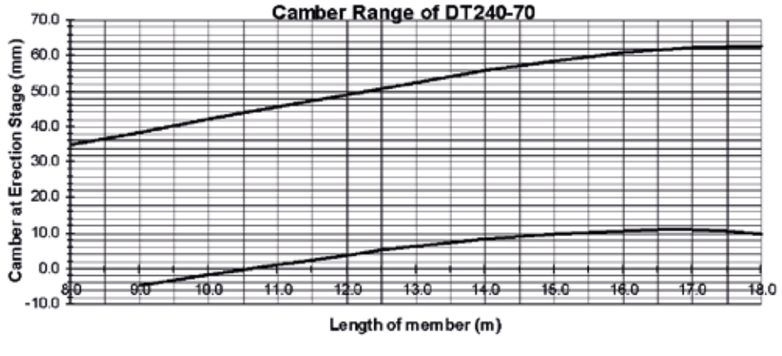


DOUBLE TEE HEIGHT 700mm

Load curves are given for maximum capacity at 120mm and 165mm leg width. Capacities are given for service load (unfactored) and ultimate load (factored). Self weight is already included in capacities.

Camber is shown for erection stage (prestressing and self-weight are considered). The two curves are showing the expected camber for highest and lowest reinforcement alternative.

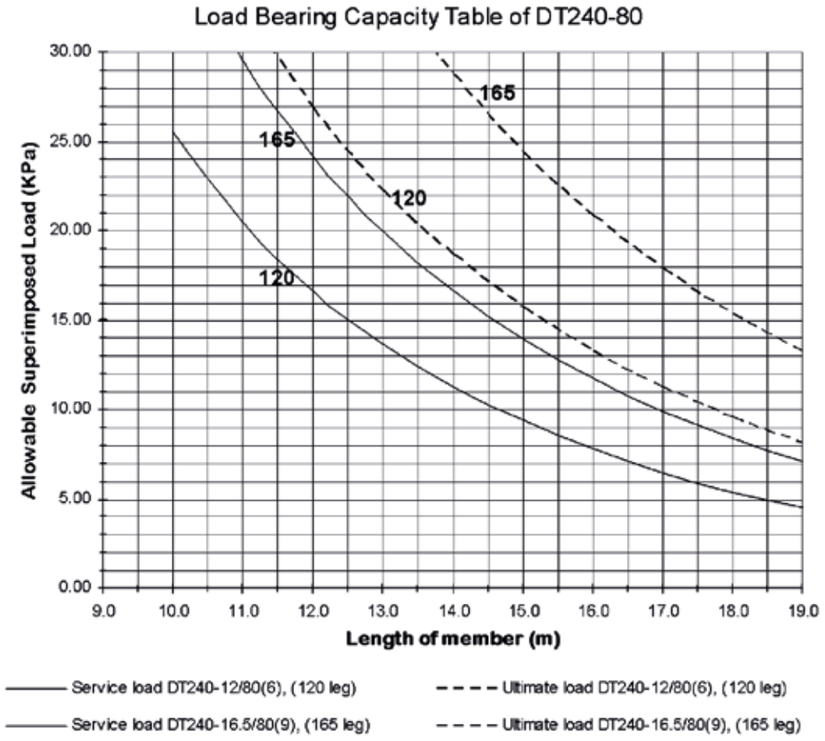


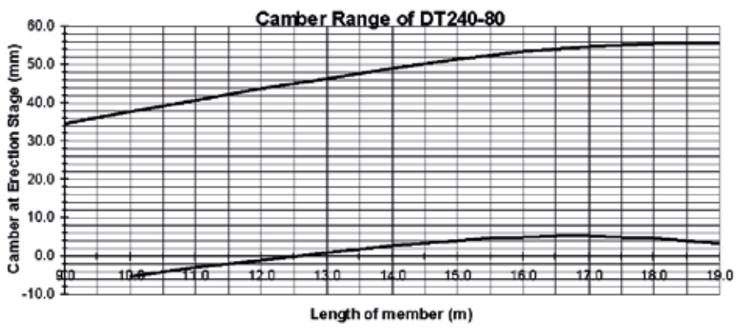


DOUBLE TEE HEIGHT 800mm

Load curves are given for maximum capacity at 120mm and 165mm leg width. Capacities are given for service load (unfactored) and ultimate load (factored). Self weight is already included in capacities.

Camber is shown for erection stage (prestressing and self-weight are considered). The two curves are showing the expected camber for highest and lowest reinforcement alternative.

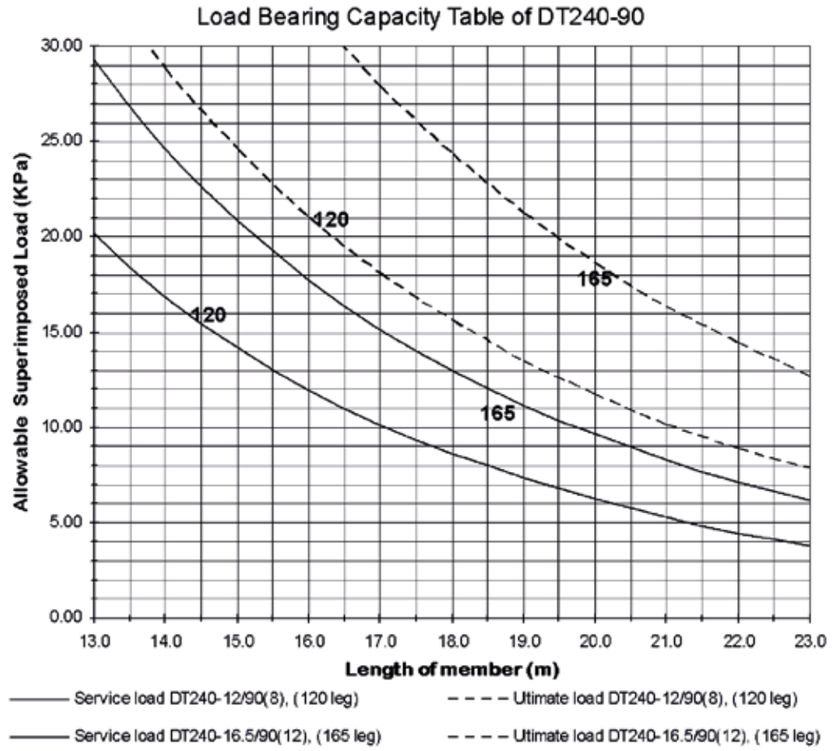


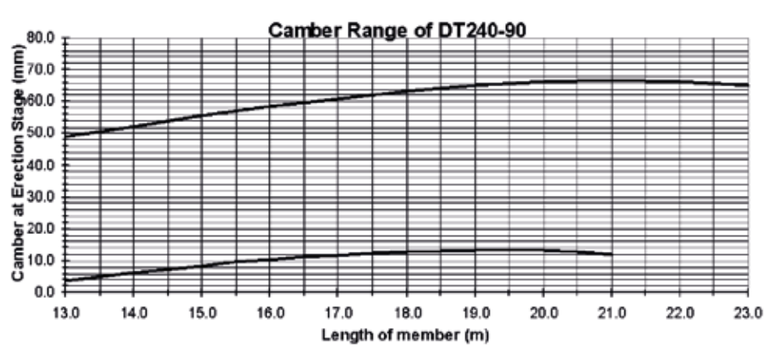


DOUBLE TEE HEIGHT 900mm

Load curves are given for maximum capacity at 120mm and 165mm leg width. Capacities are given for service load (unfactored) and ultimate load (factored). Self weight is already included in capacities.

Camber is shown for erection stage (prestressing and self-weight are considered). The two curves are showing the expected camber for highest and lowest reinforcement alternative.

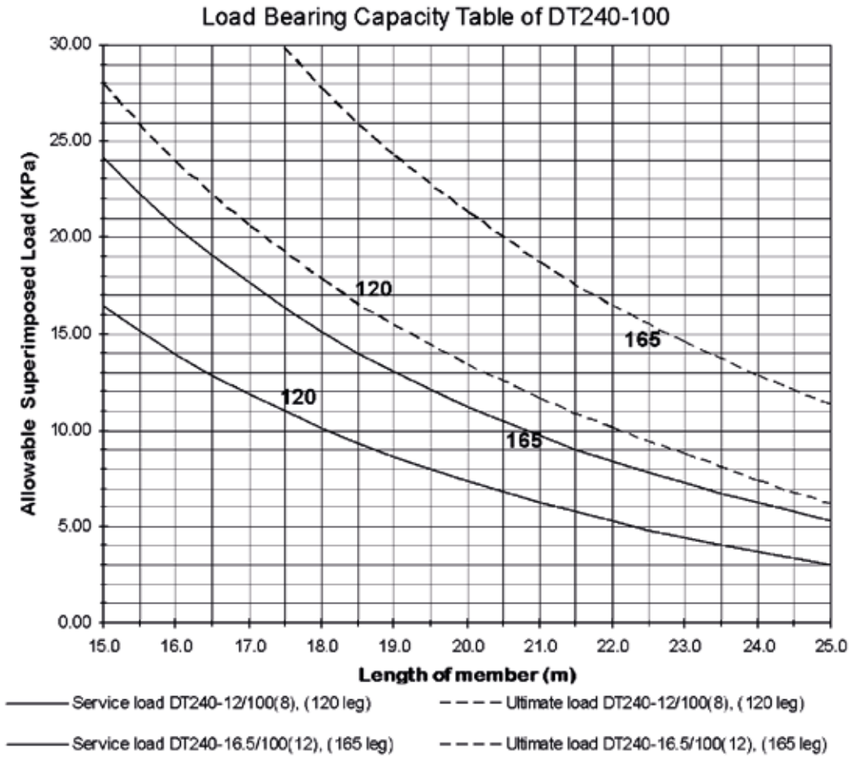


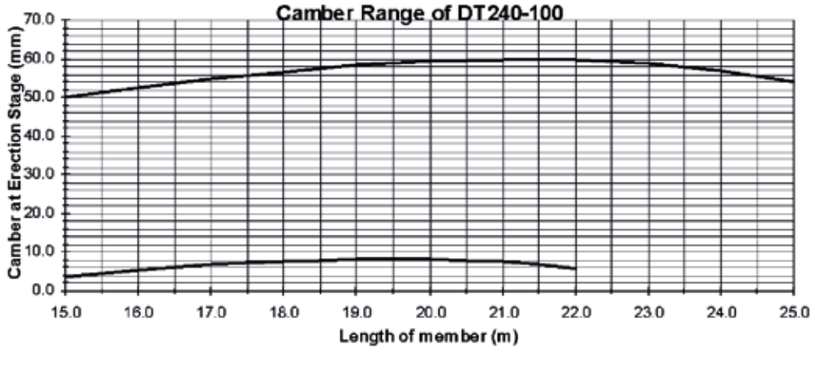


DOUBLE TEE HEIGHT 1000mm

Load curves are given for maximum capacity at 120mm and 165mm leg width. Capacities are given for service load (unfactored) and ultimate load (factored). Self weight is already included in capacities.

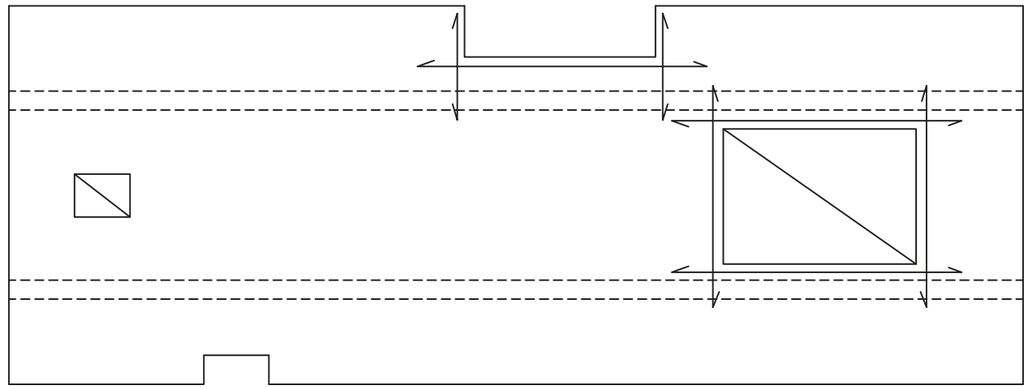
Camber is shown for erection stage (prestressing and self-weight are considered). The two curves are showing the expected camber for highest and lowest reinforcement alternative.





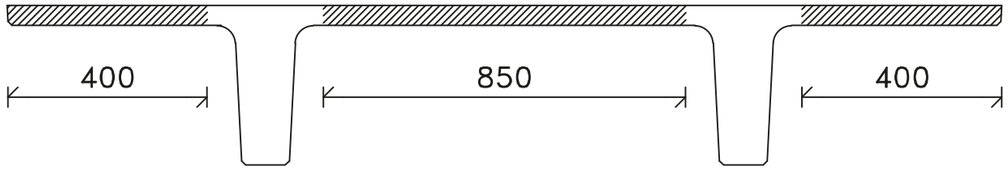
HOLES, OPENINGS, ETC.

Holes in the slab part of the Double Tee Slab:



Holes and openings in the slab with all sides less than 400mm can be made without further control.

Holes and openings in the slab with any side more than 400mm should be provided reinforcement.



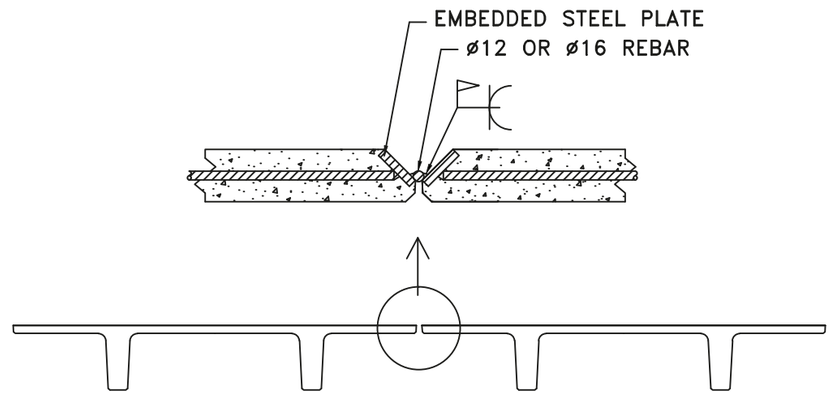
Zones where holes are allowed (shear reinforcement has to be considered).

Suspended items has to be coordinated with AlRashid-Abetong design.
We can provide embedded sockets, anchor channels or information about zones where expansion bolts can be used.

JOINTS, SUPPORTS, ETC.

SHEAR FORCES IN JOINTS

Shear forces (Vertical and horizontal) between slabs are taken care of by cast in steel plates welded together (see below). Screed can also be used for this purpose.



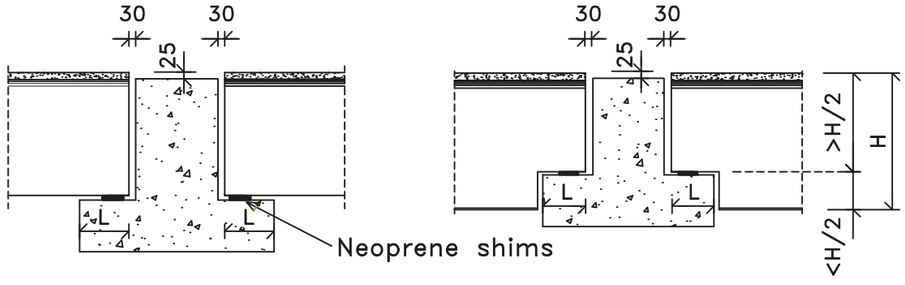
SUPPORT

Support length (L, see below) should be minimum 150 mm for Double Tee Slabs Ledge should be minimum 200 mm. Neoprene pads for support should be provided as advised by AlRashid-Abetong design.

The fabrication tolerance for length of Double Tee Slab is +/- 25 mm (1 inch). For this reason it is recommended to have a minimum gap of 30 mm between end of slab and the web of beam (see below). If the beam is cast on site it is necessary to consider the tolerance also for the straightness of beam when deciding about gap and ledge width.

In order to minimize construction height, it is possible to make dapped ends for Double Tee legs (see below to the right). The height for the bearing part of leg however, should never be less than half of total height.

It is recommended to have top of beam level at least 25 mm below top of slab.
(These instructions are valid also for support on rectangular beams of walls.)



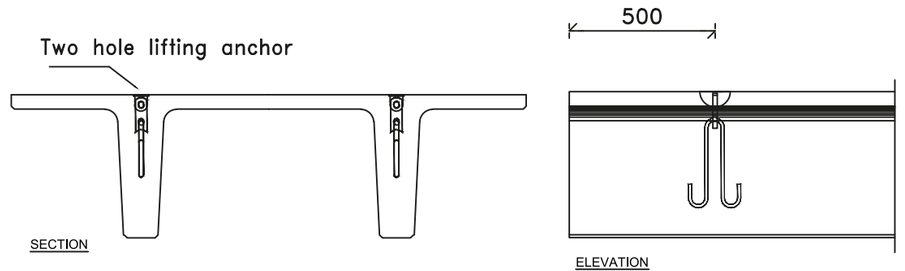
(These instructions are valid also for support on rectangular beams or walls.)

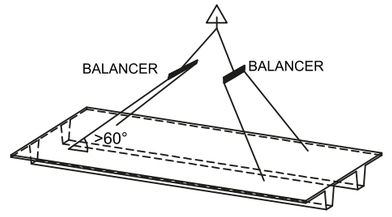
ERECTIONS, SITE CONDITIONS

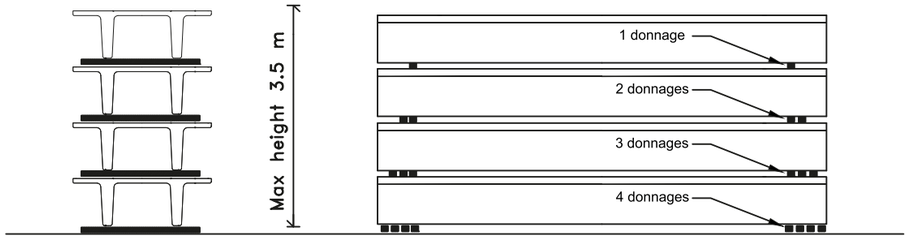
LIFTING, HANDLING

The Double Tee slab is provided with 4 lifting hooks (see below) and should be lifted in accordance with figures below to make sure that all 4 lifting units are equally loaded.

Double Tee Slabs can be stacked up to 3.5m height with number of elements accordingly. The number of dunnages (placed outside lifting hook) increases downwards in the stack. Dunnages should be placed as close to end as possible.





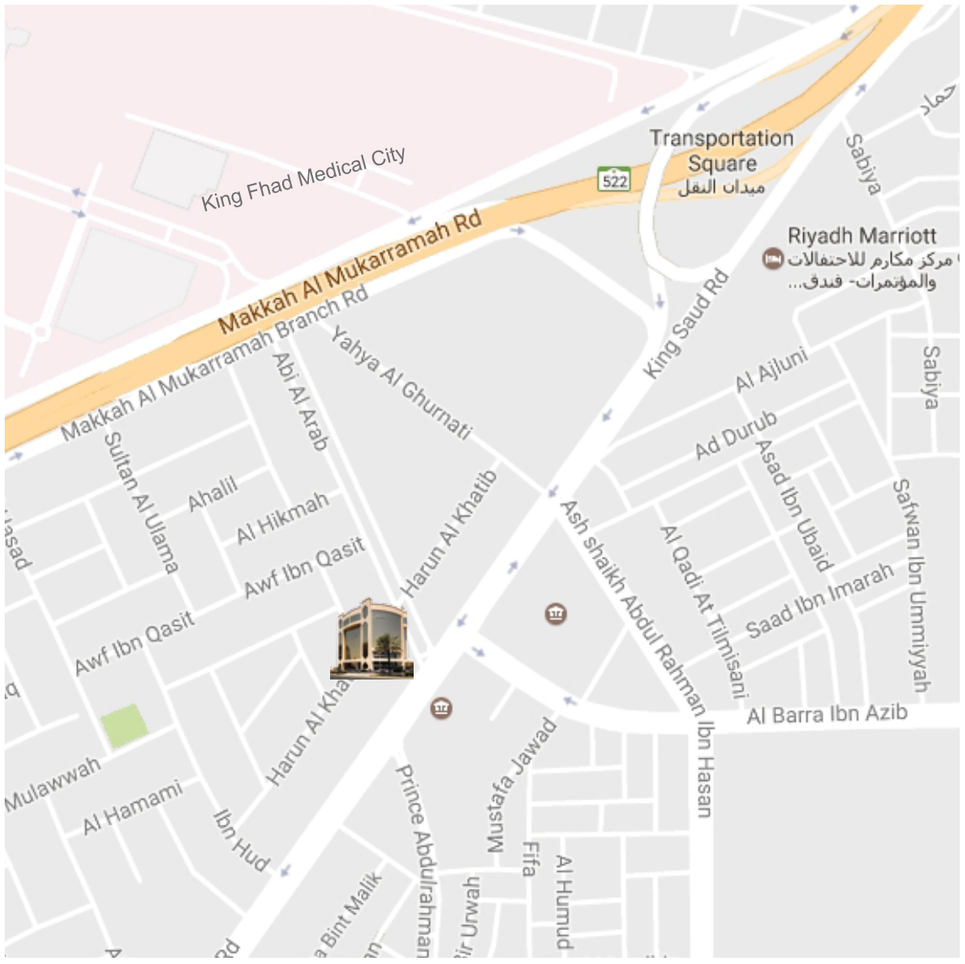


SOME OF THE COMPLETED PROJECTS

Al Rashid Mega Mall - Madinah

KSU Staff Housing - Riyadh

HEAD OFFICE LOCATION MAP



https://www.google.com.sa/maps/@24.6823664,46.7074149,18z

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