

The PLDesign module USER MANUAL

PLPAK Version 2.00 STRUCTURAL ANALYSIS SOFTWARE USING THE BOUNDARY ELEMENTS METHOD

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Introduction

In these Tutorials we are going to design a Hospital parts (A, B, C and D)

In Part (A) we are going to design Slabs as Main and Additional reinforcement.

In Part (B) we are going to design a strips & local contour loaded from PLPost.

In Part (C) we are going to design Slabs as Strips based region.

In Part (D) we are going to know how to design beams.

Part A - Slab design using main and additional reinforcement



First Step Define Design Code, Units, Materials:

- From the Define model details choose the Code name & the Code parameters list.
- After determining the Design Code, Assign the force and length units.
- We can add/remove material properties from the design material part otherwise we can use the default one.

Second Step Load (.LC) file:





Open the file menu Import .LC.

Determine the Load Cases file (.LC) then click open.



Third Step Design Slabs:

In part (A) we are going to design the Slab as Main reinforcement and additional one.

Define model details	Design Slabs	Design Beams	Punching chec	k Deflection Strips	Match properties	Start detailin
		Design Slabs				
		Main model	Add	trip to main		
			Creat	e new region		
			Edit			
						
		-	Dele	e		
		Region prope	erties			
		Show ba	sic reinforcement area			
		Show ad	ditional reinforcement ar	ea 👘		
		Sta	rt slab design	Close		

Select Design Slabs Create new region Select Basic + Additional reinforcement areas

Draw regio Draw regio OR Define poin	n Draw	
Point	x	Y
Point 1	54,12993	65.85251
Point 2	-8.237853	65.63965
Point 3	-4.406385	-2.262475
Point 4	52.2142	-2.688193
 Point 4 Basic + Strip bi N1 2 	52.2142 Additional reinford	-2.688193
 Basic + Strip bit N1 2 Number of 	52.2142 Additional reinford ased region strips required in d	-2.688193 rement areas
 Point 4 Basic + Strip bit N1 2 Number of N2 2 	52.2142 Additional reinford ased region strips required in d	-2.688193
Basic + Strip bi Number of Number of	52.2142 Additional reinford ased region strips required in d strips required in d	-2.688193 rement areas rection 1 rection 2
Point 4 Basic + Strip ba N1 2 Number of N2 2 Number of Spacing 1	52.2142 Additional reinford ased region strips required in d	-2.688193 rement areas rection 1 rection 2

After Drawing the Region, determine the design strip internal point spacing then press OK The PLDesign begin to solve the slab to get the straining action for the selected region



Define model details Design Slabs	Design Beams	Punching check	Deflection Strips	Match properties	Start detailing
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1ain model Legion 2	Add strip to main model
	Create new region
	Edit
	Delete
Region properties Show basic reinforce Show additional reinforce	ement area

After solving the selected region, select the Design Slabs then press Edit tab to open edit design slab window.

	Strip properties					
Area 1	Width: 0		Status:	ToBeSolve	ed 👻 💟	Show enabled.
	Major design Major design Major design	1xx 👻	Material:	Default lb	in 👻 🛙	Envelope design.
	Minor design M parameter:	1yy 🔻	Load case /combination	: LoadCase	1 👻 Er	nvelope:
	Top major steel	Bottom major	steel Top mino	r steel Bot	tom minor	Refresh
	Bar diameter:	0.01	Number of	0		Calculate
	Maximum +ve 0	bending momer	nt: Maximun 0	n -ve bendin	g moment:	Add additional reinforcementt batches
esgin slab spans:	Span properties					
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esgin slab spans: Span 1	Span properties Slab thickness: Cover: Top cover:	0.2700000107 0 0	72; Singly rei Alpha Major: Alpha minor:	nforced. [0.2 0.2] Force dou	ubly reinforced section.
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Select the Major design parameter, Minor design parameter, Material Properties, Load case/combination

Then determine the bar diameter and the number of required rebar for Top major steel, Bottom major steel, Top minor steel & Bottom minor steel.

	Strip properties								
Area 1	Width:	0	St	ta <mark>t</mark> us:	ToBeS	iolved 👻	🔽 Sh	iow enabl	ed.
	Major design parameter:	Мхх -	M	aterial:	Defau	lt Tonf 👻	🔄 En	ivelope de	esign.
	Minor design parameter:	Муу -	Lo /c	oad case combination:	LoadC	ase1 🔻	Envelo	ope:	
	Top major stee	Bottom majo	r steel	Top minor	steel	Bottom mir	nor 4	Re	efresh
	Bar diameter:	0.012		Number of	5	í.		Ca	lculate
	Maximum +ve 4.664940539	e bending mome 16757	ent:	Maximum 4.664940	-ve ber 1539167	nding mome 757	ent:	Add a reinfo	additional rcementt itches
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Desgin slab spans: Span 1	Span properties Slab thickness:	0.270000010	72:	Singly rei	forced.	. 🕅 Forc	e doubly r	reinforced	l section.
Desgin slab spans: Span 1	Span properties Slab thickness: Cover:	0.270000010	72: C] Singly reir pha Major:	forced. 0.2	. 🕅 Forc	e doubly r	reinforced	i section.
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Press Calculate then refresh tab to get the maximum +ve/-ve bending moment values.

	Strip properties					
Area 1	Width: 0		Status:	ToBeSolved -	V Show	v enabled.
X	Major design Major design	1xx -	Material:	Default Tonf 👻	Enve	elope design.
	Minor design M parameter:	Туу 🗸	Load case /combination	LoadCase1 👻	Envelop	e:
	Top major steel	Bottom major st	eel Top minor	steel Bottom mind	N 4 🕨	Refresh
	Bar diameter:	0.012	Number of	5		Calculate
	Maximum +ve 4.6649405391	bending moment: .6757	Maximum 4.664940	-ve bending momen 53916757	nt:	Add additional reinforcementt batches
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esgin slab spans: Span 1	Span properties Slab thickness:	0.27000001072	Singly reir	forced. 📃 Force	doubly rei	nforced section.
lesgin slab spans: Span 1	Span properties Slab thickness: Cover:	0.27000001072	Singly reir	forced. 🔲 Force	doubly rei	nforced section.
iesgin slab spans: Span 1	Span properties Slab thickness: Cover: Top cover:	0.27000001072 0 0	Singly rein Alpha Major: Alpha minor:	forced. Force	doubly rei	nforced section.
esgin slab spans: Span 1	Span properties Slab thickness: Cover: Top cover: Top major steel	0.27000001072 0 0 Bottom major st	Singly reir Alpha Major: Alpha minor: eel Top minor	forced. Force 0.2 0.2 steel Bottom mind	doubly rei	nforced section.
esgin slab spans: Span 1	Span properties Slab thickness: Cover: Top cover: Top major steel Asteel top major	0.27000001072 0 0 Bottom major st or direction: 0	Singly reir Alpha Major: Alpha minor: eel Top minor	forced. Force 0.2 0.2 steel Bottom mino Minimum number of	doubly rei or steel	nforced section.
kesgin slab spans: Span 1	Span properties Slab thickness: Cover: Top cover: Top major steel Asteel top major Bar diameter:	0.27000001072 0 0 Bottom major st or direction: 0.	Singly reir Alpha Major: Alpha minor: eel Top minor	forced. Force 0.2 0.2 steel Bottom mind Minimum number of Number of required	doubly rei or steel Frebars: Frebars:	0 0
esgin slab spans: Span 1	Span properties Slab thickness: Cover: Top cover: Top major steel Asteel top major Bar diameter:	0.2700001072 0 0 Bottom major st or direction: 0.	Singly reir Alpha Major: Alpha minor: eel Top minor	forced. Force 0.2 0.2 steel Bottom mind Minimum number of Number of required	doubly rei or steel rebars: f rebars:	nforced section.

Select Add additional reinforcement batches.

Areas list	Draw addition Draw region OR Define point:	nal reinforcem	ent area
	Point	x	Y
	Point 1		
	Point 2		
	Point 3		
	Point 4		
Add		_	Create
Remove	7		

Create additional reinforcement areas is opened press on add to select the place of the additional reinforcement needed.



The entire blue region satisfies the basic reinforcement and the red regions need additional reinforcement.

a cogin older inter	Strip properties				
Area 1	Width: 0	Status:	ToBeSolved -	Show	enabled.
Alta 1	X Major design parameter: Mxx	 Material: 	Default Tonf 👻	🗐 Envelo	ope <mark>d</mark> esign.
	Minor design Myy parameter:	 Load case /combination 	LoadCase1 👻	Envelope:	
	Bottom major steel Te	op minor steel Bottom m	inor steel		Refresh
	Bar diameter: 0.016	Number of	5		Calculate
	Maximum +ve bendir 8.29322762518676	g moment: Maximur 8.29322	n -ve bending mome 762518676	nt:	Add additional reinforcementt batches
Desgin slab spans:	Span properties				
Span 1	Slab thickness: 0.270	00001072; 🔲 Singly rei	nforced. 🔲 Force	e doubly rein	forced section.
Add. rft area 3	Cover: 0	Alpha Major:	0.2		
	Top cover: 0	Alpha minor:	0.2		
	Top major steel Botto	m major steel Top minor	steel Bottom min	or steel	
	Asteel top major direc	tion: 0	Minimum number o	rebars:)
	Asteel top major direc Bar diameter:	tion: 0 0.01	Number of require	d rebars:)
	Asteel top major direc	0.01	Minimum number o	d rebars: ()

Add. Rft area 2 and Add. Rft area 3, Select the top/bottom Cover, Asteel top major direction, bar diameter, number of required rebars.

design M design M design M deter: M m major ste diameter: ximum +ve 1932276251	xx v yy v eel Top mino 0.016 bending mom .8676	St Ma Lo /o or steel Nu re ent:	atus: aterial: ad case ombination: Bottom mir umber of quired reba	ToBeSolved Default Tonf LoadCase1 nor steel 5	Show Envelope	w enabled. elope design. s: Refresh
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liameter: ximum +ve 1932276251	0.016 bending mom .8676	ent:	umber of quired reba	5		
ximum +ve 1932276251	bending mom 8676	ent:	quireu reba			Calculate
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properties						
hickness:	0.270000010	72	Singly rein	nforced. 🗌 Force	e doubly rei	nforced section.
:	0.01	Alp	oha Major:	0.2		
over:	0.01	Alp	oha min <mark>o</mark> r:	0.2		
najor steel	Bottom majo	or steel	Top minor	steel Bottom min	or steel	
el top majo	r direction:	0		Minimum number o	of rebars:	0
diameter:		0.012		Number of require	d rebars:	5
	nickness: ivver: najor steel el top majo diameter:	iconess: 0.270000010 iconess: 0.01 o.01 o.01 ajor steel Bottom major el top major direction: diameter:	Nonessi 0.2700001072 P : 0.01 Al wer: 0.01 Al agior steel Bottom major steel Al el top major direction: 0 0 diameter: 0.012 Al	Noness: 0.2700001072 Singly reir : 0.01 Alpha Major: wer: 0.01 Alpha minor: aajor steel Bottom major steel Top minor el top major direction: 0 Image: Singly reir diameter: 0.012 Image: Singly reir	Noness: 0.27000001072; Singly renoration cell. For one provide the provided t	Noness: 0.27000001072; Singly renoration and the proceed doubly residence of the proceed double of the proceed doub

Instead of changing all the properties of all span properties. We can use Match properties

Define model details Design Slabs Design Beams Punching check Deflection Strips Match properties Start detailing

lab spans Beams	Beam s	ections	
Source region :		Destination region:	
Region 2	•	Region 2 👻	
Source area :		Destination area:	
Area 1	+	Area 1 👻	Top major steel
Source span:		Destination span:	Bar diameters
Span 1		Span 1	Bar amounts
Add. rft area 2		Add. rft area 2	
	22		Bar diameters Number of bars Bottom major steel Bar diameters
Dimensions		Section data	Vumber of bars
 Slab thickness Bottom cover Top cover 		 Is Singly reinforced Force doubly reinforced section. Alpha values 	Top major steel Bar diameters Number of bars
		Match slabs	

Select Slab Spans, Source region, Destination region, Source Span, Destination span.

Then click Match slabs

	outp properties					
Area 1	Width:	D	Status:	ToBeSolved -	V Shov	enabled.
Area 1	Major design parameter:	Мхх •	Material:	Default Tonf 🔻	Enve	lope design.
	Minor design Minor design	Муу	Load case /combination	: LoadCase1 👻	Envelope	
	Bottom major st	teel Top mind	or steel Bottom mi	inor steel	< > [Refresh
	Bar diameter:	0.016	Number of	5		Calculate
	Maximum +ve 8.293227625	e bending mom 18676	ent: Maximun 8.29322	n -ve bending momer 762518676	nt:	Add additional reinforcementt batches
esgin slab spans:	Span properties					
Span 1 Add_rft area 2	Slab thickness:	0.270000010	172: 🔽 Singly rei	nforced. 🗌 Force	doubly rei	nforced section.
Add. rft area 3	Cover:	0.01	Alpha Major:	0.27000001072		
	Top cover:	0.01	Alpha minor:	0.27000001072		
	Top major steel	Bottom majo	or steel Top minor	steel Bottom mino	r steel	
	Asteel top maj	jor direction:	0	Minimum number of	rebars:	0
	Bar diameter:		0.012	Number of required	rebars:	5
Errors:						

All Spans have changed their properties according to the Matched source.

Main model	Add strip to main
Region 2	model
	Create new region
	Edit
	Delete
Region properties	
Show basic reinford	cement area
Show additional rei	inforcement area
Ctart dab das	

Press on Start slab design to analyze the selected additional region.

Then Export the calculation excels sheets.

Exporting		×
Would you like to	export calculation sheets of the designed elements?	
Yes		
Export path:	C:\Users\mahmoud\Desktop\PLDesign files	Browse
🔘 No		
	ОК	

cagin aldua llaci	Strip properties					
Area 1	Width: 0		Status:	Solved -	Shov	v enabled.
	Major design N parameter: N	1xx 🗸	Material:	Default Ib-in 👻	Enve	lope design.
	Minor design Minor design Minor design	1yy →	Load case /combination	LoadCase1 👻	Envelope	
	Bottom major st	eel Top minor ste	el Bottom mi	inor steel		Refresh
	Bar diameter:	0.016	Number of	5		Calculate
	Maximum +ve 11.79744032	bending moment: 90538	Maximun 11.7974	n -ve bending mom 403290538	ent:	Add additional reinforcementt batches
esgin slab spans:	Span properties					
Span 1 Add. rft area 2	Slab thickness:	0.27000001072	🔽 Singly rei	nforced. 🗌 Ford	e doubly rei	nforced section.
Add. rft area 3	Cover:	0.01	Alpha Major:	0.27000001072		
	Top cover:	0.01	Alpha minor:	0.27000001072		
	Top major steel	Bottom major st	eel Top minor	steel Bottom mi	nor steel	
	Asteel top majo	or direction: 0.0	0057134512	Minimum number	of rebars:	5.05180006724
	Bar <mark>d</mark> iameter:	0.0	12	Number of require	ed rebars:	5
-	1					
brrore'						

The Minimum number of rebars has been calculated and the Number of required rebars needs to be changed to satisfy the minimum requirement.

We can also see the exported excel files for each Additional reinforcement areas



Additional reinforcement area 2 (Mxx direction)

Rij B	E4E-P	LDesign -	[1.LoadCa	ase1-tit	le1-LoadCas	e1]
	File	View	Action	Desig	n Detailin	ig Help
L		Import LO			Q Re	Ø. Đ
Re	2	Open (.re	s) Ctrl+	0	ms Manager	r Assemb
		Open (.de	esO)			
	H	Save	Ctrl+	S		
		Export de	sign data			
		Page Setu	ıp		1	
		Print Prev	riew			
	3	Print	Ctrl+	P		
		Exit				
1						
Export desig	n data			_		
Export sla	abs			Expo	ort beams	
Slab regio	ns:			Desig	n beams:	
Main mod	lel					
Region 2	(
Select a	all	Deselec	t all	Se	lect all	Deselect all
Export pu	Inchina	assemblies		Expo	rt reinforcemen	t to Revit
Punching	assembl	lies:		Level	name in Revit:	
						Export
				Ехро	ort summary files	s (.xls)
					Export beams	
					Export slabs	
					Export punching	g assemblies
						Export
Select a	all	Deselec	t all			Close
				_		

We can export the design data to be shown as excel sheet for all slab areas

Press on Export design data from file menu then choose the slab region, mark on Export slabs then Export.

HUMMON	St ENGINEERS	PLD	ESIGN	: Slab re	einforcem	nent shee	ţ
Company Project Designe Review Approv	Name: Name: ed By: ed By: ed by:						
Region name	Area name	Major design moment	Strip name	lop major rft.	Bot. major rft.	lop minor rft.	Bot mmor rft.
			Span 1	5 Φ 0.016	5 Φ 0.016	5 Φ 0.016	5 Φ 0.016
Region 2	Area 1	Mxx	Add. rft area 2	5 Φ 0.01	0 Φ 0.01	5 Φ 0.01	0Φ0.01
	10 00 00 00 00 00 00 00 00 00 00 00 00 0		Add. rft area 3	5 Φ 0.01	0 Φ 0.01	5 Φ 0.01	0 Φ 0.01

After design and export the calculation sheets, we are going to show the slab details from the detailing menu









Then I need also <u>a Certain Contour</u> to be designed using PLDesign.

First Step Assign the Strips for design:

In this case we need to prepare the PLPost before using PLDesign.

🎸 BE4E-PLPost - [1.LoadCase1-title1 File View Draw Action Import LC Re .L Open Ctrl+O QI 🞽 er P Save Ctrl+S H Page Setup Print Preview 3 0 Print Ctrl+P Exit 🍓 Organize 👻 🎬 Views 👻 🎼 New Folder Date modified Type Name Size Favorite Links 鷆 drop Documents 📕 LoadCase1 🔢 Recent Places 鷆 Without Drop Panel 📃 Desktop 🐋 1.LC 👰 Computer Music 😥 Recently Changed B Searches Public Folders ~ File name: 🚺 Load Cases File (*.LC) • - 0 Open Cancel BE4E-PLPost - [1.LoadCase1-title1-LoadCase1] - 0 - X-File View Draw Action He . 0 X .LC 🗋 🖆 🔄 🔿 📿 Re 🖉 🗟 🕂 🇰 🎬 🍯 Ơ 🌂 📹 🗗 💞 Ö 🤻 BCs Loads BCsLege Quad. Contour Max/Min Draw Strip Query Solve Results Manager Paths Manager Select Case PL Co ies Manager Beams Π П nt Load Case: Loadcase 1

Open PLPost and import (.LC) file

Select Draw Strip Press Shift + Drag the mouse to draw a straight line

Rec. Contour Quad. Contour Max/Min Draw Strip

Select the Results Manager then change the coordinates of the start/end point of the strip to get achieve the strip needed for design.

Query	Solve	Results Manager	Paths Manager Select Case PL Controls Assemblies Manager	Beams
		Recults Manager	×	
		Results Manager		
		Strips		
		Strip 2	X ID: Sup 2 Enabled: V LAPV	
			Npoints: 30 Result: Mxx V	
			Start: 63.372,22 End: -2.493,22	
			Status: Solved v theta: 0 Use Local	

		Contours		
		Main Contour	X ID: Main Contour Enabled: Export	
			N: 8 Spacino: 0.5	
			Min Te Heardefined:	
			May Is Userdefined: mar: 0	
			Status: ToBeSolved Current variable:	
	4		Itheta: 0	
		Column Plot		
		Enabled: 📃 👔	N: 8 Max Is Userdefined: max: 0	
		Current Variable:	Z Min Is Userdefined: min: 0	
		Refresh	h Show Total Forces: Export	
			Close	
		L		

Press Solve to analyze the Strips



Now we are going to save the result analysis to call it from PLDesign.

				🆣 Organize 👻 🏭 V	ews 🔻 📔	New Folder			0
				Favorite Links	Name	Date modified	Туре	Size	
••••••••••••••••••••••••••••••••••••••	E4E-I File	PLPost - [1.LoadCas View Draw Import LC Open Ctrl+O	e1-title Action Re er F	 Documents Recent Places Desktop Computer Music Recently Changed More >> 	Je dro Je Loa Je Wit □ 1.re □ 2.re	p kdCase1 khout Drop Panel ks			
0		Save Ctrl+S		Folders	~				
	2	Page Setup Print Preview Print Ctrl+P Exit		File name: 2 Save as type: R	.res esult (*.res)		S	ave (▼ ▼ Cancel

Second Step Assign the contour area for design:

From the PLPost draw rectangular contour



Results Manager			£ .	X	
Strips					
	X ID:		Enabled:	Expor	
	Npoints:		Result:	•	
	Start:		End:		
	Status:	•	theta:	Use Local	
0					
5.5.5.5.5.5.5.5.5.5.5.5.5.5.5.5.5.5.5.				CARE COLLEC	
Contours					
Main Contour	ID:	Contour 1	Enabled:	Export	
Contour 1					
	N: 2	3	Spacing: 0.5		
	Min Is l	Jserdefined: 🕅	min: 0		
	Max Is l	Jserdefined: 🔲	max: 0		
	Status:	FoBeSolved	Current Variab	le: Mxx 💌	
	Itheta:)			
Column Dist.		10	_	_	4
Column Plot					
Enabled: 🔲 N	I: 8 M	ax Is Userdefined: 📃	max: 0		
_		=	min: 0		
Current Variable: FZ	• • •	lin Is Userdefined:			

Select the Results Manager

Press Solve to analyze the contour area

 Query
 Solve
 Results Manager
 Paths Manager
 Select Case
 PL Controls
 Assemblies Manager
 Beams

Now we are going to save the result analysis to call it from PLDesign.

			organize and		~	actual st				
BE4E- E File .L Qu	PLPost - [1.LoadCat View Draw Import LC Open Ctrl+O Save Ctrl+S	Action Re er F	Favorite Links	Nam d V V 2	e rop Vithout D .res	Date modified	Туре	Size		
Q. ()	Print Preview Print Ctrl+P		File name: Save as type:	D:\Ace work Result (*.res)	k\Dr.yous	sef Group\ramiz\r	amiz\B\con	tour.res		•
	Exit		Hide Folders						Save	Cancel

Third Step Define Design Code, Units, Materials:

	Assemblies Manager Define model deta	ils Design Slabs Design	Beams Punchin	g check Deflection Stri	ps Match properties	Start detailing	13 0 0 0
Model coture							
During H							
model	newmouch						
Define model details							
During states							
Code Name:	Code parameters list:						
ACI	PHI-Flexure Parameter na	ame: PHI-Flexure					
N 1 . NT	meter de	escription: Strength reductio	n factor.				
select New n	nodel box neter va	alue: 0.9					
Select New n	nodel box	slue: 0.9 Model units					
Default b-in Default b-in	Material name: Default Ib-In	alue: 0.9 Model units Force unit	lb 🗸				
Default Ib-in Default Ib-in Default kip-in Default kip-in	Material name: Default b-in Concrete properties	alue: 0.9 Model units Force unit Lenath Unit	lb -				
Default b-in Default b-in Default kp-in Default kp-in Default kp-in Default kp-in	Material name: Default b-n Concrete properties Econcrete: 3604997	Nodel units Force unit Length Unit	lb •				
Default b-in Default b-ft Default b-ft Default kp-ft Default kN-ft Default kN-ft Default kN-ft Default kN-ft Default kN-ft Default kN-ft	Material name: Default Ib-In Concrete properties Econcrete: 260/1997 Pou Concrete: 4000	Nodel units Force unit Length Unit	lb v in v				
Default b-n Default b-n Default ko-n Default ko-n Default ko-n Default ko-m Default ko-m Default ko-m Default ko-m Default ko-m Default ko-m	Material name: Default b-in Concrete properties Econcrete: 2004997 Pcu Concrete: 4000 Sited properties	slue: 0.9 Model units Force unit Length Unit	lb • In •				
Select New 11 Default ben Default kipen Default kipen Default kiven Default kiven Default kiven Default kiven Default kiven Default kiven Default kiven Default kiven	Material name: Default b-in Concrete properties Econorete: 3004997 Fou Cancrete: 4000 Steel properties Ethed: 2000000	skue: 0.9 Model units Force unit Length Unit	b • in •				
Select New 11 Default b-in Default b-in Default ko-in Default ko-in	Material name: Default b-in Concrete properties Econcrete: 500-697 Pou Concrete: 4000 Steel properties Esterel: 29000000 fy Steel Iongludmail: 50000	skue: 0.9 Model units Force unit Length Unit	b • n •				
Default b-in Default b-in Default b-in Default ko-in Default ko-in	Material name: Default b-in Concrete properties Econorete: 300-997 Fou Concrete: 4000 Steel properties Extend: 2900000 fy Steel (strucps): 10000	Alue: 0.9 Model units Force unit Length Unit	ib • in •				

- From the Define model details choose the Code name & the Code parameters list.
- After determining the Design Code, Assign the force and length units.
- We can add/remove material properties from the design material part otherwise we can use the default one.

Forth Step Load the Strips in PLDesign:

Open PLDesign Import Load Case file (.LC) then Open the result file (.res)





ale constants

File	View	Action	D
	Import L	С	
2	Open (.r	es) Ctrl-	+0
	Open (.d	les0)	
	Save	Ctrl	+S
	Export d	esign data	3
	Page Set	up	
2	Print Pre	view	
8	Print	Ctrl	+P
	Exit		

Favorite Links		Name	Date modified	Туре	Size	
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Folders	^					
File name:	2.res					8
Save as type:	Result	t (*.res)				-
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Fifth Step Design Slabs Strips:

In part (B) we are going to design the Slab Strips from PLPost.

Design Slabs				
Main model	Add strip to main model			
	Create new region	Create a design sla	b	
	Delete	Pleases choose	e a result type option:	
Region properties		🔘 Crea	te a designslab from a cont	our.
Show direction 2 are	as	Orea	ite a <mark>d</mark> esign slab from a strip	o.

Create a design slab from strips	Create_a_design_slab_from_strips_definiti
Strip list (choose result strip): Strip 1 Strip 2	Choose width definition strips: Strip lat (width definition):
	Define strip width Width: 1
OK Cancel	OK Cancel

Select Design Slabs Add strips to main model Choose Create a design slab from a strip Choose the result strip Define strip width.

De	sign Slabs
1	Main model Add strip to main model Create new region Edit
	Delete Region properties Show direction 1 areas Show direction 2 areas Start slab design Close
dit Design Slab Main model Desgin slabs list: Desgin strip 1 X	Strip properties Width: 1 Status: ToBeSolved If Show enabled. Major design Max Material: Default Tonf Envelope design. Minor design May /combination: Load Case 1 Envelope: Image: Status:
	Top major steel Bottom major steel Bottom minor steel Bottom minor steel Refresh Bar diameter: 0.01 Number of required rebars: 0 Calculate Maximum +ve bending moment: 0 Maximum +ve bending moment: Add additional 0 0 0 Endote Calculate
Desgin slab spans: Desgin span 1 Desgin span 2 Desgin span 4 Desgin span 4 Desgin span 5 Desgin span 7 Desgin span 7 Desgin span 9 Desgin span 10 Desgin span 11 Desgin span 12	Span properties Slab thickness: 0.27000001072 Singly reinforced. Force doubly reinforced section. Cover: 0 Alpha Major: 0.2 Top major steel Bottom major steel Bottom major steel Top minor steel Asteel top major direction: 0 Bar diameter: 0.01
Errors: Errors in major direction: Errors in minor direction:	

After defining strip width we need to edit the strip properties but we will find that each design strip contains a number of design spans according to the shape of moment so we have to make all design span the same by using Match properties



Check that all design span have been changed as the source span

	Strip properties						
Design strip 1	Width:	1	St	tatus:	ToBeSolved 👻	Show	enabled.
	Major design parameter:	Мхх	• M	aterial:	Default Tonf 👻	Enve	lope design.
	Minor design parameter:	Муу	- Lo	oad case combination:	LoadCase1 👻	Envelope	:
	Top major stee	el Bottom ma	jor steel	Top minor	steel Bottom minor	4 2	Refresh
	Bar diameter	0.01	1	Number of	0		Calculate
	Maximum +v 0	e bending mon	nent:	Maximum 0	ars: -ve bending momen	t	Add additional reinforcementt batches
Desgin slab spans:	Span properties	5					
Design span 1 Design span 2 Design span 3	Slab thickness:	0.27000001	1072:	Singly rei	forced. Force	doubly reir	forced section.
Design span 1 Design span 2 Design span 3 Design span 4	Slab thickness: Cover:	0.27000001	1072i 🔽 Alp] Singly reir pha Major:	forced. Force	doubly reir	forced section.
Design span 1 Design span 2 Design span 3 Design span 4 Design span 5 Design span 6	Slab thickness: Cover: Top cover:	0.27000001 0.05 0.05	L072i 🗹 Alp] Singly reir pha Major: pha minor:	forced. Force 0.27000001072 0.27000001072	doubly reir	nforced section.
Design span 1 Design span 2 Design span 3 Design span 4 Design span 5 Design span 6 Design span 7 Design span 8	Slab thickness: Cover: Top cover: Top major stee	0.27000001 0.05 0.05 el Bottom ma	1072i 🗹 Alp Alp jor steel	Singly reir pha Major: pha minor: Top minor	forced. Force 0.27000001072 0.27000001072 steel Bottom mino	doubly reir	forced section.
Design span 1 Design span 2 Design span 3 Design span 4 Design span 4 Design span 5 Design span 7 Design span 7 Design span 9 Design span 10 Design span 11	Slab thickness: Cover: Top cover: Top major stee Asteel bottom	0.27000001 0.05 0.05 el Bottom ma	IO72: Alp Alp jor steel n:)	Singly reir pha Major: pha minor: Top minor	forced. Force (0.27000001072 0.27000001072 steel Bottom minor Minimum number of t	doubly reir	offorced section.
Design span 1 Design span 2 Design span 3 Design span 3 Design span 4 Design span 5 Design span 6 Design span 7 Design span 8 Design span 10 Design span 11 Design span 12	Slab thickness: Cover: Top cover: Top major stee Asteel bottom Bar diameter:	0.2700000 1 0.05 0.05 el Bottom ma	1072: Al; Al; jor steel n:) 0.016	Singly reir pha Major: pha minor: Top minor	forced. Force 0.2700001072 0.2700001072 steel Bottom minor Minimum number of r Number of required	doubly reir r steel rebars: [rebars: [forced section.
Design span 1 Design span 2 Design span 3 Design span 3 Design span 4 Design span 5 Design span 6 Design span 7 Design span 8 Design span 8 Design span 10 Design span 10 Design span 12	Slab thickness: Cover: Top cover: Top major stee Asteel bottom Bar diameter:	0.2700000 f 0.05 0.05 el Bottom ma	1072: Alp Alp jor steel n:) 0.016	Singly reir pha Major: pha minor: Top minor	forced. Force 0.27000001072 0.27000001072 steel Bottom minor Minimum number of Number of required	doubly rein	forced section. 0 5
Design span 1 Design span 2 Design span 3 Design span 4 Design span 5 Design span 5 Design span 7 Design span 7 Design span 8 Design span 9 Design span 10 Design span 11 Design span 12 Errors: Errors:	Slab thickness: Cover: Top cover: Top major stee Asteel bottom Bar diameter:	0.2700000 1 0.05 0.05 el Bottom maj	1072: Al; jor steel n:) 0.016	Singly reir pha Major: pha minor: Top minor	forced. Porce- 0.2700001072 0.2700001072 steel Bottom minor Minimum number of Number of required	doubly reir r steel rebars: [rebars: [nforced section.

Design Slabs		
Main model	Add strip to main model Create new region	
	Edit	Exporting
Region properties Show direction 1 areas Show direction 2 areas Start slab design	Delete	Would you like to export calculation sheets of the designed elements? Yes Export path: No OK OK
	Browse For Fold Choose the ex Choose the ex Recy Cad New D D D Sara STRE Make New F	ler Cancel

Start Slab design to see the reinforcement for each design span.

	Strip prop	erties					
Design strip 1	Width:		1	Status:	Solved 👻	Show	enabled.
	Major des parameter	er: Mxx 👻	Material:	Default Tonf 👻 🔄 En		velope design.	
	Minor desi parameter	gn [Муу 👻	Load case /combination	LoadCase1 👻	Envelope	:
	Top majo	r stee	Bottom major :	steel Top mino	r steel Bottom min		Refresh
	Bar diam	neter:	0.01	Number of	0		Calculate
	Maximu 0	m +ve	bending momen	t: Maximun 0	oars: ` n -ve bending mome	nt:	Add additional reinforcementt batches
)esgin slab spans: Design span 1 Design span 2 Design span 3	Span prop Slab thick	erties ness:	0.27000001072	2; 🔽 Singly rei	inforced.	e doubly reir	nforced section.
Design span 4 Design span 5 Design span 6	Top cover:	:	0.05	Alpha minor:	0.2		
Design span 4 Design span 5 Design span 6 Design span 7	Top majo	: r stee	0.05	Alpha minor:	0.2	or steel	
Design span 4 Design span 5 Design span 6 Design span 7 Design span 8 Design span 8 Design span 10 Design span 10	Top cover: Top cover Top majo Asteel bo	: r stee ottom	0.05	Alpha minor: steel Top mino .00079203122	0.2 r steel Bottom min Minimum number o	or steel	3.93924015358
Design span 4 Design span 5 Design span 6 Design span 7 Design span 8 Design span 9 Design span 10 Design span 11 Design span 12	Top cover: Top cover Top majo Asteel bo Bar diam	: r stee ottom eter:	0.05 I Bottom major : minor direction:) 0	Alpha minor: steel Top mino .00079203122 .016	0.2 r steel Bottom min Minimum number o Number of require	or steel frebars: (d rebars:	3.93924015358 [.] 5
Design span 4 Design span 5 Design span 5 Design span 6 Design span 7 Design span 8 Design span 8 Design span 10 Design span 11 Design span 12	Top cover: Top majo Asteel bo Bar diam	: r stee ottom eter:	0.05 Bottom major s minor direction:) 0	Alpha minor: steel Top mino .00079203122	0.2 r steel Bottom min Minimum number o Number of require	or steel	3.93924015358 [,] 5

Each Design will show the minimum number of rebars for the selected diameter and show the export Excel sheets



Design span 1 (Mxx direction)



Design span 2 (Mxx direction)

LEMENTS FOR	F	LEXU	JRA	L DESI	GN of a S	ingle R	Reinforc
4	0.9	Rec	tang	ular Se	ction Acc	ording	to ECP
E D		a R	ilab No: egion ID:	D	Main model	pan 11	Type of sectio
			Comp Proj Desi Revi App	any Name: ect Name: igned By: iewed By: roved by:			
imensions & Moment	1	_		N	faterials	1	-
Moment (M)	32651241	N.mm		Steel yie	id Strength (fy)	344.73787	N/mm ²
Concrete clear cover ©	50	mm		Steel You	ng's Modulus (E)	27.579031	N/mm ²
Records and Complete State				Course of the second	ete Strain (C)	CLORDS	
Depth of Section (d) Design	1220	mm	(8 = 7 - 1	Partial Factor	s Ye Ya	15 13	
Depth of Section (d) Design $(0.67 * f cx * b * d) - \sqrt{1}$ $x = \frac{22.3972875}{Fcmax}$ $x = \frac{2}{3} * \frac{Ecmax}{Fcmax} + \frac{12}{V_{p}}$	220 ((0.67 × fcu × 2 × (0 mm steel	mm 8×d) - 4× 67×fru×	* (0.67 * j 2)	Partial Factor	n Ye Ya (e+M/2)]	13	
Design $\frac{Design}{(0.67 * f C t + b \times d) - \sqrt{t}}$ $= \frac{12.397280}{F_{CM221} + \frac{12.397280}{V_{F_{c}}}}$ eve 0.0445334080 $\frac{d}{0.80}/d$	220 (0.67 × fcu × 2 × (0. mm	mm <u>8 × d) - 4 ×</u> 67 × f cu × Check C	* (0.67 * / 2)	Partial Factor	n ¥c ¥a (c - M/2)]	13	
$\begin{array}{c} \hline \textbf{Design} \\ \hline (0.57 * fcx + b \times d) - \sqrt{1} \\ = \frac{12.397207}{7_{5}} \times \frac{12.997207}{Ecmax} + \frac{10}{V_{F_{c}}} \\ = \frac{1}{2} \sqrt{5} \times \frac{1000}{Ecmax} + \frac{100}{V_{F_{c}}} \\ = \frac{1}{2} \sqrt{5} \times \frac{1000}{2} \\ = \frac{1000}{2} \sqrt{5} \sqrt{5} \\ = \frac{1000}{2} \sqrt{5} \sqrt{5} \sqrt{5} \\ = \frac{1000}{2} \sqrt{5} \sqrt{5} \sqrt{5} \sqrt{5} \\ = \frac{1000}{2} \sqrt{5} \sqrt{5} \sqrt{5} \sqrt{5} \sqrt{5} \\ = \frac{1000}{2} \sqrt{5} \sqrt{5} \sqrt{5} \sqrt{5} \sqrt{5} \sqrt{5} \sqrt{5} 5$	230 ((0.67 × fcu × 2 × (0, mm steei rom *4 + ¥p	mm <u>8 × d) - 4</u> 67 × f cu × 2 Check C	(0.67 ×) 2)	Partial Factor	та — ¥е — ¥та (е - М/2)]	1.15	
$\begin{array}{c} \label{eq:bound} \hline \textbf{Design} \\ \hline \textbf{(0.57+fct)} + fct + b + d) - \sqrt{1} \\ = & \frac{12 \ 3972873}{Ecmat + \frac{10}{V_{F_{E}}}} \\ = & \frac{1}{2} \frac{3972873}{Ecmat + \frac{10}{V_{F_{E}}}} \\ = & \frac{1}{0.44533808} \\ \frac{d}{0.01/d} \\ = & \frac{0.6794699129}{V_{F} + fy} \\ = & \frac{0.679469129}{V_{F} + fy} \\ = &$	230 (0.67 × fcu × 2 × (0, mm steri rom * a + ½ mm ⁴	mm δ7 × f cu × 2 Check C	* (0.67 *))) *	Partial Factor	n ¥c ¥s		
$\begin{array}{c} \label{eq:constraint} \text{Design} \\ \hline \textbf{(0.57 + f(x + b + d) - \zeta)} \\ (0.57 + f(x + b + d) - \zeta) \\ = & \frac{123.9972973}{f_{2}} + \frac{2673972973}{f_{2}} \\ = & \frac{123.9972973}{f_{2}} \\ = & 123.9972973$	$\frac{230}{((0.67 * fcu + 1))}$ $\frac{2 * (0.67 * fcu + 1)}{2 * (0.67 * fcu + 1)}$ $\frac{2 * (0.67 * fcu + 1)}{10 * mm}$ $\frac{4 * 4 * y_0}{10 * mm}$ $\frac{4 * 4 * y_0}{10 * mm}$	mm <u>8 × d) - 4</u> <u>67 × fru × 1</u> Check C mt 4247.171	(0.67 ×) })	Partial Factor	т ¥с ¥з		
$\label{eq:second} \begin{split} & \frac{\mathbf{Design}}{\mathbf{Design}} \\ & \frac{\mathbf{Design}}{\mathbf{Design}} \\ & = \frac{1}{f_1 \times 1000000000000000000000000000000000000$	220 ((0.67 × fcu × 2 × (0. mm 2 × (0. mm 2 × (0. mm 4 ± + ½) mm ² iteret Attacions ((b × d)) Street Attacions	mm b * d) - 4 + 67 * f cu *	(0.67 ×) 2) (Conax)	Partial Pacto	та ¥с. ¥з		



We can export the design data to be shown as excel sheet for all slab areas

R B	E4E-P	LDesign - [1.Load	Case1-title	1-LoadCase	1]
	File	View Action	Design	Detailing	Help
. L		Import LC		Q Re	Ø€
Re	2	Open (.res) Ctr	+0 m	s Manager	Assemb
		Open (.des0)		-	
	H	Save Ctr	·l+S		
		Export design dat	a		
	Q	Page Setup Print Preview			
	9	Print Ctr	1+P		
		Exit			
Slab re	gions: nodel ct all	Deselect all	Design be	al De	select all
Export Punchin	t punchi ng assei	ng assemblies mblies:	Export re Level nan	inforcement to Rent to R	evit Export
			Export si Exp Exp Exp Exp	ummary files (.xls ort beams ort slabs ort punching asse) imblies Export
Sele	ct all	Deselect all			Close

Press on Export design data from file menu then choose the slab region, mark on Export slabs then Export.

HILL A LL	En Encintering	PL	DESIGN	N : Slab re	einforcen	nent sheet	
Company Project Design Review Approv	7 Name: Name: ed By: ed By: ed by:	r					
legion name	Area name	lajor design mor	erStrip name	op major rft	Bot. major rf	Top minor rft	Bot minor rf
			Design	6 Ø 0.016	0 @ 0.016	6 0 0.016	0 Φ 0.016
			Span 1				2017/02/25
			span 2	6 Φ 0.016	0 Φ 0.016	6 0 0.016	0 Φ 0.016
			Design	6 0 0 016	0 m 0 016	6 0 0 016	0 0 0 016
			span 3	0 - 0.010	3 - 0.010	0 + 0.0.0	0 + 0.010
			Design	6 Φ 0.016	0 Ф 0.016	6 Φ 0.016	0 Φ 0.016
			Design	22642020205	1975 (1988)	1000000000	
			span 5	6 Φ 0.016	0 Ф 0.016	6 Φ 0.016	υΦ0.016
			Design	6 Φ 0.016	0 0 0.016	6 Φ 0.016	0 Φ 0.016
			span 6		0.010		
1011110	Desian	650.92	Design spap 7	6 Φ 0.016	0 Ф 0.016	6 Φ 0.016	0 Φ 0.016
Main model	strip 1	Max	Design	0.00.000	0 + 0.010	0.000	310.0.00
	140022320		span 8	6 4 0.016	0 4 0.016	6 4 U.UI6	0 4 0.016
			Design	6 Φ 0.016	0 Φ 0.016	6 Φ 0.016	0 Φ 0.016
			Span 9		A	Concepted by	2011/10/2011
			span 10	6 ¢ 0,016	0 Ф 0.016	6 Φ 0.016	0 Φ 0.016
			Design	80,000	0 m 0 016	8 0 0 016	0 ¢ 0 016
			span 11	0.000	3 4 0:010	0 - 0.016	0 + 0.010
			Design	6 Φ 0.016	0 Φ 0.016	6 Φ 0.016	0 Φ 0.016
			Design			0.0.000	0.0.000
			span 13	6 O 0.016	U O 0.016	5 4 U.U16	0 4 0.016
			Design	6 Ø 0.016	0 0 0.016	6 Φ 0.016	0 Φ 0.016
			span 14				

After design and export the calculation sheets, we are going to show the slab details from the detailing menu

🕲 BE4E-PLDesign - [1.LoadCase1-title1-LoadCase1]	o X
🛃 File View Action Design Detailing Help	_ 8 ×
🗄 🗜 🗋 🚰 Open (.des) 🚽 🚑 🗓 Start detailing 🔯 🍏 🏹 📹 🗗 💞 🖓 BCs Loads BCs Legend Supports Reactions Assemblies Legend Slabs Slab RFT Beams Beams Data	Ŧ
Results Manager Select Case Beams Manager Assemblies Manager Define model details Design Slabs Design Beams Punching check. Deflection Strips Match properties Start detailing	

Sixth Step Load the Contour in PLDesign:

Open PLDesign Import Load Case file (.LC) then Open the result file (.res)



Environite Links	Name	Date modified	Type	Size	
Documents Documents Recent Places Desktop Computer Music Recently Changed Searches Public	iko drop LoadC d 1.LC	asel			
Folders	^				
File na	me:		+	Load Cases File (*.LC)	-





·	Name	Date modified	Type	Size	
Favorite Links Favorite Links Cocuments Recent Places Esktop Computer Recently Changed Music Searches Public	↓ droj ↓ Witt © 2.re	nout Drop Panel	C C	LoadCasel LoadCasel 2 Lres 2 contour.res	
Folders	^				
File name	D:\Ace work\E	r.youssef Group\ramiz\r	ramiz\B\contour.	res	
The name.					



Seventh Step Design Slabs Contour:

In part (B) we are going to design the Slab Strips from PLPost.

ine model details	Design Slabs	Design Beams	Punching check	Deflection Strips	Match properties	Start deta
Design Slabs						
Main model		Add strip to main model				
	C	reate new region				
		Edit		Create a design sl	ab	
		Delete		Pleases choo	se a result type option:	
Region prop	oerties irection 1 areas			Ore	ate a designslab from a contou	r.
Show di	irection 2 areas			Cre	ate a design slab from a strip.	
St	art slab design	Close		O	Cancel	
		Create a	design slab from a cont	tour		
		Cont	tour list:			
		Mai Mai	n Contour n Contour			
		Cor	ntour 1			
		Plea	se choose the required co	ntours.		
			OK Cancel			

Select Design Slat Add strips to main model Choose Create a design slab from a contour Choose the required contours

	Strip properties					
Decign etrip 1	Width:	0	Status:	ToBeSolved -	Show	enabled.
Design strip 2 Design strip 3 Design strip 4	Major design parameter:	Mxx 👻	Material:	Default Tonf 👻	Envel	ope design.
Design surp 4	Minor design parameter:	Муу 👻	Load case /combination:	LoadCase1 👻	Envelope	
	Top major stee	Bottom major ste	el Top minor	steel Bottom mino		Refresh
	Bar diameter:	0.01	Number of	0		Calculate
	Maximum +vi 0	e bending moment:	Maximum	-ve bending momen	t:	Add additional reinforcementt batches
Desgin slab spans:	Span properties					
Design span 1	Slab thickness:	0.27000001072	🔽 Singly rein	nforced. 🗌 Force	doubly rein	forced section.
	Cover:	0.01	Alpha Major:	0.2		
	Top cover:	0.01	Alpha minor:	0.2		
	Top major stee	Bottom major ste	el Top minor	steel Bottom mino	r steel	
		minor direction:)	1	Minimum number of	rebars:)
	Asteel bottom	minor di cedoni /				
	Asteel bottom Bar diameter:	0.01	6	Number of required	rebars: 0)
	Asteel bottom Bar diameter:	0.01	6	Number of required	rebars: ()

After defining the required contour we need to edit the design slab properties but we will find that each design strip contains a number of design spans according to the shape of moment so we have to make all design span the same by using Match properties

Slab spans Beams Bea	m sections Punching asms.		
Source region :	Destination region:		
Main model	✓ Main model		
Source area :	Destination area:	mer in min	
Design strip 1	🗸 Design strip 3 🗸 🗸	Top major steel	
Source span:	Destination span:	Bar diameters	
Design span 1	Design span 1	Bar amounts	
		Top minor steel	
		Bar diameters	
		Vumber of bars	
		Bottom major steel	
		Bar diameters	
Dimensions	Section data	V Number of bars	
Slab thickness	Is Singly reinforced	-	
Bottom cover	Force doubly	l op major steel	
Top cover	reinforced section.	Bar diameters	
	Alpha values	V Number of bars	
	Match alaba		

Check that all design span have been changed as the source span

Main model		
Desgin slabs list:	Strip properties	
Design strip 1	Width: 0 Status: ToBeSolved - V Show enabled.	
Design strip 2 Design strip 3	Major design Mxx Material: Default Tonf Envelope design.	
Design strip 4	Minor design Myy Load case /combination: LoadCase1 Envelope:	
	Top major steel Bottom major steel Top minor steel Bottom minor	
	Bar diameter: 0.01 Number of 0 Calculate	
	Maximum +ve bending moment: Maximum -ve bending moment: Add additional	
	0 0 batches	
Desgin slab spans:	Span properties	
Design span 1	Slab thickness: 0.27000001072; Singly reinforced. Source doubly reinforced section.	
	Cover: 0.01 Alpha Major: 0.2700001072	
	Top cover: 0.01 Alpha minor: 0.27000001072	
	Top major steel Bottom major steel Top minor steel Bottom minor steel	
	Asteel top major direction: 0 Minimum number of rebars: 0	
	Bar diameter: 0.016 Number of required rebars: 0	
Errors:		
in model Add strip to m model	nain	
Add strip to m model Add strip to m model Create new re Edit Edit Delete egion properties Show direction 1 areas Show direction 2 areas	egion Exporting Vould you like to export calculation sheets of the designed elements? Ves Export path:	Browse
Add strip to m model Create new re Edit Delete egion properties Show direction 1 areas Show direction 2 areas	egion Exporting Would you like to export calculation sheets of the designed elements? Vould you like to export calculation sheets of the designed elements? Vould you like to export calculation sheets of the designed elements? No No	Browse
an stabs in model Add strip to m model Create new re Edit Edit Delete egion properties Show direction 1 areas Show direction 2 areas	egion Exporting Would you like to export calculation sheets of the designed elements? Ves Export path: No No	Browse
in model Add strip to m model Create new re Edit Edit Delete egion properties Show direction 1 areas Show direction 2 areas Ctart slab design Cla	agion Exporting Would you like to export calculation sheets of the designed elements? Yes Export path: No OK OK	Browse
an stabs in model Add strip to m model Create new re Edit Edit Delete egion properties Show direction 1 areas Show direction 2 areas Ctart slab design Clo	egion Exporting Would you like to export calculation sheets of the designed elements? Yes Export path: No OK OK	Browse
in model Add strip to m model Create new re Edit Edit Delete Show direction 1 areas Show direction 2 areas Ctart slab design Cic	agion Exporting Would you like to export calculation sheets of the designed elements? Yes Export path: No OK OK	Browse
in model Add strip to m model Create new re Edit Edit Delete Show direction 1 areas Show direction 2 areas Ctart slab design Clo	agion Exporting Would you like to export calculation sheets of the designed elements? Yes Export path: No OK OK	Browse
in model Add strip to m model Create new re Edit Edit Delete Show direction 1 areas Show direction 2 areas	egion Exporting Would you like to export calculation sheets of the designed elements? Yes Export path: No OK OK Choose the export folder:	Browse
in model Add strip to m model Create new re Edit Delete Show direction 1 areas Show direction 2 areas	egion Exporting Would you like to export calculation sheets of the designed elements? Yes Export path: No OK OK Choose the export folder:	Browse
in model Add strip to m model Create new re Edit Edit Delete Show direction 1 areas Show direction 2 areas Careas	Exporting Would you like to export calculation sheets of the designed elements? Yes Export path: No OK Choose the export folder:	Browse
in model Add strip to m model Create new re Edit Edit Delete egion properties] Show direction 1 areas] Show direction 2 areas [Start slab design Clo	egion Exporting Would you like to export calculation sheets of the designed elements? Yes Export path: No Coc Rrowse For Folder Recycle Bin Chain Coc Chain	Browse
in model Add strip to m model Create new re Edit Edit Delete Show direction 1 areas Show direction 2 areas	egion Exporting Would you like to export calculation sheets of the designed elements? Yes Export path: No Cocc Rrowse For Folder Recycle Bin Choose the export folder: Recycle Bin Choose the export folder: Mapage Mapage Mapage	Browse
in model Add strip to m model Create new re Edit Edit Delete egion properties Show direction 1 areas Show direction 2 areas Start slab design Clo	egion egion Exporting Would you like to export calculation sheets of the designed elements? Yes Export path: No OK CK Choose the export folder: Recycle Bin Choose the export folder: MAP3D New Folder	Browse
in model Add strip to m model Create new re Edit Edit Delete Show direction 1 areas Show direction 2 areas Start slab design Cle Br	egion	Browse
in model Add strip to m model Create new re Edit Edit Delete Show direction 1 areas Show direction 2 areas Careas	egion	Browse
in model Add strip to m model Create new re Edit Edit Delete Show direction 1 areas Show direction 2 areas Careas	egion	Browse
in model Add strip to m model Create new re Edit Edit Delete Show direction 1 areas Show direction 2 areas Cda	egion	Browse
in model Add strip to m model Create new re Edit Edit Delete Show direction 1 areas Show direction 2 areas Careas	egion	Browse

Start Slab design to see the reinforcement for each design span.

Jesgin slabs list:	Strip properties					
Design strip 1	Width:		Status:	Solved 👻	Show	enabled.
Design strip 2 Design strip 3	Major design	txx 👻	Material:	Default Tonf 👻	Envel	ope design.
Design strip 4	Minor design Minor design Minor design	1yy 👻	Load case /combination	LoadCase1 👻	Envelope	-
	Top major steel	Bottom major st	eel Top minor	steel Bottom minor	• •	Refresh
	Bar diameter:	0.01	Number of	Dars: 0		Calculate
	Maximum +ve 0	bending moment:	Maximum	 ve bending moment 		Add additional reinforcementt batches
Desgin slab spans:	Span properties					
Design span 1	Slab thickness:	0.27000001072;	Singly reir	nforced. 🗌 Force (doubly rein	forced section.
	Cover:	0.01	Alpha Major:	0.27000001072		
	Top cover:	0.01	Alpha minor:	0.27000001072		
	Top major steel	Bottom major st	eel Top minor	steel Bottom minor	steel	
	Asteel top mind	r direction: 0.0	00106842674	Minimum number of	rebars:	5.31391869983
	Bar diameter:	0.0	016	Number of required	rebars:	6
Errors:						

Each Design will show the minimum number of rebars for the selected diameter and show the export Excel sheets

All DEAF	-PLDesign - [1.LoadC	ase1-title1-LoadCase1]
🖳 Fil	e View Action	Design Detailing Help
Re ≌	Import LC Open (.res) Ctrl+	0 ms Manager Assemb
	Save Ctrl+	-S
	Export design data	
Q ()	Page Setup Print Preview Print Ctrl+	.P
ort design	data	
Slab regions Main mode Select all Export pun Punching as	: Deselect all ching assembles sembles:	Design beams: Select al Deselect al Export reinforcement to Revit Level name in Revit: Level name in Revit: Export
		Export summary files (.xis) Export beams Export slabs Export punching assemblies Export

We can export the design data to be shown as excel sheet for all slab areas

Press on Export design data from file menu then choose the slab region, mark on Export slabs then Export.

LEEMENTS BEL 4 E	SR ENGINEERS	PLD	ESIGN	: Slab re	einforcem	nent shee	<u>t</u>
Company Project I Designe Review Approv	Name: Name: ed By: ed By: ed by:						
Region name	Area name	Major design moment	Strip name	Top major rft.	Bot. major rft.	Top minor rft.	Bot minor rft.
	Design strip 1	Mxx	Design span 1	6 Ф 0.016	0 Φ 0.01	6 Φ 0.016	<mark>0 Φ 0.01</mark>
Main model	Design strip 2	Mxx	Design span 1	6 Φ 0.016	0 Φ 0.01	<u>6 Ф 0.016</u>	0Φ0.01
Iviain ifiodel	Design strip 3	Mxx	Design span 1	6 Φ 0.016	0 Φ 0.01	6 Φ 0.016	0Φ0.01
	Design strip 4	Мхх	Design span 1	6 Φ 0.016	0 Φ 0.01	6 Φ 0.016	0Φ0.01

After design and export the calculation sheets, we are going to show the slab details from the detailing menu

🗑 BE4E-PLDesign - [LLoadCase1-title1-LoadCase1]	- 0 X
🙀 File View Action Design Detailing Help	_ 8 ×
🗼 L C 🗋 🚰 Open (.des) 🚽 🖂 🤇 Start detailing 🕅 🎽 🍏 🏹 📹 🗗 🖤 🦉 BCs Loads BCs Legend Supports Reactions Assemblies Legend Slabs Slab RFT Beams Beams Data	Ŧ
Results Manager Select Case Beams Manager Assemblies Manager Define model details Design Slabs Design Beams Punching check. Deflection Strips Match properties Start detailing	

Part C – Strip based slab design



In part (C) we are using PLDesign for designing Strips based design which is similar as designing solid slabs.



First Step Define Design Code, Units, Materials:

- From the Define model details choose the Code name & the Code parameters list.
- After determining the Design Code, Assign the force and length units.
- We can add/remove material properties from the design material part otherwise we can use the default one.

Second Step Load (.LC) file:



Open the file menu \longrightarrow Import .LC.

Open Cancel

Determine the Load Cases file (.LC) then click open.



Third Step Design Slabs:

In part (C) we are going to design the Slab as strip based design.

beine model details besign blabs besign beams Punching check benection strips match properties start d	Define model details
--	----------------------

Main model Region 2	Add strip to main model
	Create new region
	Edit
	Delete
Region properties Show basic reinforce Show additional reinforce	ement area

Select Design Slab Create new region Select Strip based design Draw region

Draw region Draw region OR Define point	Draw s manually	
Point	x	Y
Point 1	28.98736	15.94485
Point 2	13.61633	15.94485
Point 3	13.61633	9.064974
Point 4	29.01294	9.090549
Point 4 Basic + Strip ba N1 3 Number of s	29.01294 Additional reinform sed region	9.090549 cement areas
Point 4 Basic + Strip ba N1 3 Number of s N2 3	29.01294 Additional reinform sed region	9.090549 cement areas lirection 1
Point 4 Basic + Strip ba Number of s Number of s Number of s	29.01294 Additional reinform sed region thips required in d	9.090549 cement areas irrection 1 irrection 2
Point 4 Basic + Strip ba Number of s Number of s Spacing 1	29.01294 Additional reinform sed region trips required in d	9.090549 cement areas lirection 1 lirection 2

After Drawing the Region, determine the design strip internal point spacing then press OK

Define model details	Design Slabs	Design Beams	Punching check	Deflection Strips	Match properties	Start detailing
		Design Slabs Main model Region 2	Add st	rip to main nodel new region		
		Region proper Show basic Show addit	ties creinforcement area tional reinforcement area	a		

Select the Design Slabs then press Edit tab to open edit design slab window.

Start slab design

Close

		Strip properties						
Area 1		Width:	E.	Status:	ToBeSol	ved 👻	Show (enabled.
Area 2 Area 3 Area 4	×	Major design parameter:	txx 👻	Material:	Default	Tonf 👻	Envelo	pe design.
Area 5 Area 6		Minor design Annual Minor design	1уу 👻	Load case /combination	LoadCa	se1 🔻 I	Envelope:	
		Top major steel	Bottom major ste	el Top minor	r steel B	ottom minor		Refresh
		Bar diameter:	0.01	Number of	0		1	Calculate
		Maximum +ve	bending moment:	Maximum 0	1 -ve bend	ing moment:		Add additional einforcementt
		Cover:	0.01	Alpha Major:	0.2			
		Top cover:	0.01	Alpha minor:	0.2			
		Top cover: Top major steel	0.01 Bottom major ste	Alpha minor:	0.2 r steel B	ottom minor :	steel	
		Top cover: Top major steel Asteel bottom r	0.01 Bottom major ste	Alpha minor: el Top minor	0.2 r steel B Minimum	ottom minor : number of re	steel]
		Top cover: Top major steel Asteel bottom r Bar diameter:	0.01 Bottom major stenninor direction:) 0.01	Alpha minor: el Top minor	0.2 r steel B Minimum Number c	ottom minor : number of re of required re	steel bars: 0 bars: 0	
Frrors:		Top cover: Top major steel Asteel bottom r Bar diameter:	0.01 Bottom major ste ninor direction:) 0.01	Alpha minor: el Top minor 16	0.2 r steel B Minimum Number c	ottom minor s number of re of required re	steel bars: 0 bars: 0	

Select the Major design parameter, Load case/combination, then determine the cover, the top cover, the bar diameter and the number of required rebar for Top major steel, Bottom major steel, Top minor steel & Bottom minor steel.

Instead of changing all the properties of all spans. We can use Match properties

Slab spans Beams Beam s	ections Punching asms.		
Source region :	Destination region:		
Region 2 👻	Region 2 👻		
Source area :	Destination area:		
Area 1 🔹	Area 6 🔹 👻	Top major steel	
Source span:	Destination span:	Bar diameters	
Design span 1	Design span 1 Design span 2	Bar amounts	
	Design span 3	Top minor steel	
		☑ Bar diameters	
		V Number of bars	
		Bottom major steel	
		☑ Bar diameters	
Dimensions	Section data	✓ Number of bars	
Slab thickness	Is Singly reinforced		
Bottom cover	Eorce doubly	Top major steel	
Top cover	reinforced section.	Bar diameters	
	Alpha values	V Number of bars	

Select Slab Spans, Source region, Destination region, Source Span, Destination span.

Then click Match slabs

		Strip properties							
Area 1 Area 2 Area 3 Area 4 Area 5 Area 6		Width: Major design parameter: Minor design parameter:	0		Status:	ToBeSolved 👻 🗹 She		w enabled.	
			Мхх	•	Material:	Defa	Default Tonf 👻 🕅 En		elope design.
			Муу	1yy 👻	Load case /combination	: Load	LoadCase1 - Envelo		ре:
		Top major stee	el B	ottom major s	teel Top mino	r steel	Bottom mine	4 P IC	Refresh
		Bar diameter:	1	0.01	Number of	Ī	D		Calculate
		Maximum +v 0	e be	nding moment	Maximur 0	n -ve be	ending mome	nt:	Add additional reinforcementt batches
esgin slab spans:	_	Span properties	,						
Design span 1 Design span 2		Slab thickness:	0.	14000000059	Singly re	inforced	i. 🗌 Force	doubly re	inforced section.
Design span 3		Cover:	0.	01	Alpha Major:	0.140	00000059		
Design span 3		Top cover:	0.	01	Alpha minor:	0.140	00000059		
		Top cover.							
		Top major stee	el B	ottom major s	teel Top mino	r steel	Bottom mine	or steel	
		Top major stee Asteel bottom	el B mino	ottom major s	teel Top mino	r steel Minimu	Bottom mine	rebars:	0
		Top major stee Asteel bottom Bar diameter:	el B mino	ottom major s or direction:)	teel Top mino	r steel Minimu Numbe	Bottom minu um number of er of required	rebars:	0
Errore		Top major stee Asteel bottom Bar diameter:	el B	ottom major s or direction:) 0.1	teel Top mino	r steel Minimu Numbr	Bottom min um number of er of required	rebars: rebars:	0

All Spans have changed their properties according to the Matched source.

lain model Legion 2	Add strip to main model
	Create new region
	Edit
	Delete
Region properties Image: style="text-align: center;">Region properties Image: style="text-align: center;">Show basic reinforc Image: style="text-align: center;">Show basic reinforc Image: style="text-align: center;">Show basic reinforc	ement area nforcem <mark>e</mark> nt area

Press on Start slab design to analyze the selected additional region.

Then Export the calculation excels sheets.

Would you like to	export calculation	sheets of th	e designe	ed elements	?	
Yes						
O 100						
Export path: 0	: Users mahmoud	VDesktop VPI	.Design fi	les		Browse
No						
	_					
	0	к				
Design Slab						1
Region 2						
Desgin slabs list:	Strip properties					
Area 1	X Width: 0	St	atus: s	olved 👻	Show	enabled.
Area 3	Major design parameter: Mxx	▼ M	aterial: C	lefault Tonf 👻	Enve	lope design.
Area 5 Area 6	Minor design Myy	- La	ad case ombination: L	oadCase1 👻	Envelope	#[
50.08 at 20	Top major steel Bo	ottom major steel	Top minor st	eel Bottom mind	× * (Refresh
	Bar diameter: 0	.01	lumber of	0		Calculate
	Maximum +ve ben	iding moment:	Maximum -\	». e bending momer	nte	Add additional reinforcementt
	0		0			batches
Desgin slab spans:	Span properties					
Design span 1	Slab thickness: 0.1	400000059	Singly reinfo	rced. 🗌 Force	doubly reir	nforced section.
	Cover: 0.0	01 Al	oha Major: 0	.2		
	Top cover: 0.0	01 Al	oha minor: 0	.2		
	Top major steel Bo	ottom major steel	Top minor st	eel Bottom mind	or steel	
	Asteel top major di	rection: 0.000	53421335 M	inimum number of	rebars:	2.65695925245
	Bar diameter:	0.016	N	umber of required	rebars:	5
Errors:	In annual					
Errors: Errors in major direction: 1	to errors.					

The Minimum number of rebars has been calculated and the Number of required rebars needs to be changed to satisfy the minimum requirement.

We can also see the exported excel files for each Additional reinforcement areas

R B	E4E-F	LDesign -	[1.LoadCa	se1-tit	le1-LoadCa	se1]
.L	File	View Import LC	Action	Desig	n Detailir	ng Help
Re		Open (.de Save	s0) Ctrl+	s	ms Manage	r Assemb
		Export des	ign data			
	4	Page Setu Print Previ Print	p iew Ctrl+	Р		
Export desig	ın data	Exit			1	
Export sla	abs			Expo	ort beams	
Slab regio	ns:			Desig	n beams:	
Region 2						
Select a	all	Deselec	tall	Se	lect all	Deselect all
Export pu Punching a	unching assembl	assemblies ies:		Expo Level	rt reinforcemer name in Revit:	t to Revit
				Expo	ort summary file Export beams Export slabs Export punchin	s (.xls) g assemblies Export
Select a		Deselect	tal			Close

We can export the design data to be shown as excel sheet for all slab areas

Press on Export design data from file menu then choose the slab region, mark on Export slabs then Export.

Compan	y Name:	PLI	DESIGN	I : Slab ro	einforcen	ient sheet	
Project	Name:			1			
Review	red By:			i			
Approv	red by:]			
Region name	Area name	Major design mome	nt Strip name	Top major rft.	Bot. major rft.	Top minor rft.	Bot minor rft.
	Area 1	Mxx	Design span 1	5 Φ 0.016	0 Φ 0.016	5 Ф 0.016	0 Ф 0.016
	Area 2	Mxx	Design span 1	5 Φ 0.016	0 \$ 0.016	5 Φ 0.016	0 Ф 0.016
	Area 3	Мях	Design span 1	5 Φ 0.016	0 Φ 0.016	5 Φ 0.016	0 Φ 0.016
			Design span 1	5 Φ 0.016	0 Φ 0.016	5 0 0.016	0 Φ 0.016
	Area 4	Max	Design span 2	5 Φ 0.016	0 Ф 0.016	5 Φ 0.016	0 Φ 0.016
Region 2			Design span 3	5 🕈 0.016	0 \$ 0.016	5 Φ 0.016	0 Φ 0.016
		62.5	Design span 1	5 Φ 0.016	0 Φ 0.016	5 0 0.016	0 0 0.016
	Area 5	Mxx	Design	5 🕈 0.016	0 Ф 0.016	5 Φ 0.016	0 Φ 0.016
		Г	Design	5 @ 0.016	0 0 0.016	5 Ф 0.016	0 Φ 0.016
	Area 6	Mxx	Design	5 0 0.016	0 Φ 0.016	5 Φ 0.016	0 Φ 0.016
			Design	5 \$ 0.016	0 Ф 0.016	5 Φ 0.016	0 Φ 0.016

After design and export the calculation sheets, we are going to show the slab details from the detailing menu





Part D - Beam design



In Part (D) we are going to know how to design beams using PLDesign.

First Step Load beam file (.basm) for design:

In this case we need to prepare the PLGen before using PLDesign.

	File	View Tools	Defin	ie Help
D		New .gen Ctr Open .gen Ctr Import	I+N I+O ♪	DXF Re Clr Ø ♥ ↔ Array Match Wall Assembly
		Export)	BE files
		Save .gen Ct	rl+S	Assemblies
	4	Drint Ctr	d + D	Beam assemblies
li		Print Co	IT F	Text format
		Page Setup		
		Exit Alt	+ F4	

Open PLGen and Export beam assemblies

avorite Links	Name	Date modified	Туре	Size
Documents Music Recently Changed	 1.basm Slab sheets details and layouts cslab 	۲:17 - 7 1 (/ - / ۲ - ۲ 27:7 - 7 - / / / / - 7 21:7 - 7 - / / / / - 7 1:7 - 7 - / / / / - 7 21:7 - 7 - / / / / / - 7	BASM File File Folder File Folder File Folder	8 KB
8 Searches	↓ c Beam sheets	τ.) τ/.)/۹, - τ: τ <u>τ</u> τ.) τ/.)/ τ, - τ: ττ	File Folder File Folder	

Second Step Define Design Code, Units, Materials:



- From the Define model details choose the Code name & the Code parameters list.
- After determining the Design Code, Assign the force and length units.
- We can add/remove material properties from the design material part otherwise we can use the default one.

Third Step Load (.LC) file:

🌗 Organize 👻 🏭 Views	🚽 📑 N	ew Folder			?
Favorite Links Documents Recent Places Desktop Computer Music Recently Changed Searches Jublic	Name drop LoadCa	Date modified	Туре	Size	
Folders					
File name:			•	Load Cases File (*.LC) Open Cancel	•

Automatically window opens to choose the (.LC) file needed to design.

Determine the Load Cases file (.LC) then click open.



Forth Step Design beams:

odel details Design Slabs	Design Beams Punch	ing check Deflec	tion Strips Match properties	Start d
Design Beams				
Design beams:				
	Show enab	oled.	Read beam data	
	Beam width:	1	Define design series	
"	Beam depth:		Start beam design	
	Solved:	ToBeSolved 🔻		
			Close	
			al.	
🕒 Organize 👻 🎟 Vie	ws 👻 📝 New Folder	_	0	,
	Name Date mo	dified Type	Size	-
Favorite Links		ijpe		-
Becent Diacer	📄 beams.basm			
Desktop				
Computer				
Music				
Recently Changed				
B Searches				
Jublic Public				
(Faller)	a			
Folders	•			
File nan	ne: D:\Ace work\Dr.youssef (Group\C\c\1.LC	■ Beam Assembly File (*.basm)	
			Open Cancel	
Design Beams				
Design beams:				
Design Beam 1	A Show enab	led.	Read beam data	
Design Beam2 Design Beam3				
Design Ream4	Beam width:	0.25	Define design regions	
Design Beams	Room dopthy	0.7		1
Design Beam5 Design Beam6		MIT	Charthean design	-
Design Beam5 Design Beam6 Design Beam7 Design Beam8	beam deput.		Start beam design	
Design Beam5 Design Beam6 Design Beam7 Design Beam8 Design Beam9	Solved:	ToBeSolved 👻	Start beam design	



Before Assign reinforcement we should see the beam numbers, beams start & beams end breaks.

Now we have to open design beam then define beam region

Define model details Design Slabs Design Beams Punching check Deflection Strips Match properties Start detailing

Design beams:				
Design Beam 1		Show enabl	ed	Durad harms data
Design Beam2	-		eu.	Keau beam data
Design Beam3	=			
Design Beam4		Beam width:	0.25	Define design regions
Design Beam5				
Design Beam6		Beam depth:	0.7	r
Design Beam/				Start beam design
Design Beam9		Solved:	Solved	+
Design Beam 10				[
Design Beam 11	-			Close

Each Design beam contains Start/End break but in case of continuous beams we will need to define the beam at each support by naming beam breaks and write its distance from the start break either Absolute or Relative.

		1	12/11/2017	1207-200	1 a harrown		
Break name:		Name	BreakPtx	BreakPty	RelDistance	AbsDistance	â
Distance from beam start break:		Start break	0.36875000596	20.0245895385	0	0	E
Absolute distance		End break	10.5462503433	20.0245095305	1	10.1775003373	_
		1	1.38650003969	26.0245895385	0.10000000000	1.01775003373	
Add		2	4.43975014090	26.0245895385	0.40000000000	4.07100013494	- I
Design sections		SI	art break: Start br	eak 👻	End break 1	•	Modify
Design sections Section name:	F	St	art break: Start br StartName	eak ▼ SectionPoint	End break 1 AbsoluteLength	▼ RelativeLength	Modify
Design sections Section name: Start break:	•	Name A	art break: Start br StartName Start break	eak SectionPoint {X=0.4663525,	End break 1 AbsoluteLength 0.09760248661	• RelativeLength 0.09590025386	Modify EndName
Design sections Section name:	Þ	Name A B	art break: Start br StartName Start break 1	eak SectionPoint (X=0.4663525, {X=2.913125, Y	End break 1 AbsoluteLength 0.09760248661 1.52662523686	RelativeLength 0.09590025386 0.50000005100	Modify EndName 1 2
Design sections Section name: Start break:	•	Name A B C	art break: Start br Start Name Start break 1 2	eak SectionPoint (X=0.4663525, (X=2.913125, Y (X=5.4575, Y=2	End break 1 AbsoluteLength 0.09760248661 1.52662523686 1.01775031685	RelativeLength 0.09590025386 0.5000006100 0.50000013909	Modify EndName 1 2 3
Design sections Section name: Start break: End break: Distance from beam start break:	•	Name A B C D	art break: Start br Start Wame Start break 1 2 3	SectionPoint (X=0.4663525, (X=2.913125, Y (X=5.4575, Y=2 (X=8.001876, Y	End break 1 AbsoluteLength 0.09760248661 1.52662523686 1.01775031685 1.52662566900	RelativeLength 0.09590025386 0.5000006100 0.50000013909 0.5000002253	Modify EndName 1 2 3 4

We need to design on the max. Bending moment at the mid spans of the beams so we have name Design sections, Showing it Start/End breaks and Show its distance from start break either Absolute or Relative distance.





In this step we are going to define the reinforcement details

Determine the reinforcement if it is singly/doubly reinforcement & the design material then press on define the reinforcement details tab.

Break name	-	Name	BreakDtV	BreakDty	RelDistance	AbeDistance	
		Start break	0.36875000596	26.0245895385	0	0	
Distance from beam start break:	ľ	End break	10.5462503433	26.0245895385	1	10.1775003373	E
Absolute distance Relative distance		1	1.3865000.3969	26.0245895385	0.1000000000	1.01775003373	
		2	4,43975014090	26.0245895385	0.40000000000	4.07100013494	*
Add	•	-	1 1007001 100011		0.10000000000	+	
Design sections Section name:		St	art break: Start br StartName	ak ▼	End break 1 AbsoluteLength	▼ RelativeLength	Modify
Design sections		St	art break: Start br StartName	ak 👻 SectionPoint	End break 1 AbsoluteLength	▼ RelativeLength	Modify
Design sections	Þ	St Name	art break: Start br StartName Start break	eak	End break 1 AbsoluteLength 0.09760248661	▼ RelativeLength 0.09590025386	Modify EndName
Design sections	Þ	St Name A	art break: Start br StartName Start break 1	eak ▼ SectionPoint {X=0.4663525, {X=2.913125, Y	End break 1 AbsoluteLength 0.09760248661 1.52662523686	RelativeLength 0.09590025386 0.50000006100	Modify EndName 1 2
Design sections Section name: Start break:	Þ	St Name A C	startbreak: Startbr Startbreak Startbreak 1 2	eak ▼ SectionPoint (X=0.4663525, (X=2.913125, Y (X=5.4575, Y=2	End break 1 AbsoluteLength 0.09760248661 1.52662523686 1.01775031685	 RelativeLength 0.09590025386 0.5000006100 0.50000013909 	Modify EndName 1 2 3
Design sections Section name: Start break: End break: Distance from beam start break:	Þ	Name A B C D	art break: Start br Start Vame Start break 1 2 3	eak ▼ SectionPoint (X=0.4663525, (X=2.913125, Y (X=5.4575, Y=2 (X=8.001876, Y	End break 1 AbsoluteLength 1.52662523686 1.01775031685 1.52662566900	RelativeLength 0.09590025386 0.5000006100 0.50000013909 0.5000002253	Modify EndName 1 2 3 4
Design sections Section name: Start break: End break: Nstance from beam start break: Absolute distance Relative Relative distance Relative		Name A B C D E	art break: Start br Start break Start break 1 2 3 4	SectionPoint (X=0.4663525, (X=2.913125, Y (X=5.4575, Y=2 (X=8.001876, Y (X=10.40692, Y	End break 1 AbsoluteLength 0.09760248661 1.52662523686 1.01775031685 1.52662566900 0.87842298448	RelativeLength 0.09590025386 0.5000006100 0.50000013909 0.5000002253 0.86310287925	Modify EndName 1 2 3 4 End break

Su animy actions	60	Part Inc.	G			
Design cell: lexure design load	29	Design beam element:	1			
case/combination:	LoadCase1 👻	Design moment:	2.116986513133	Cover to	0.025	
hear design load case/combination:	LoadCase 1 👻	Design shear:	5.822586536401		0.025	
orsion design load case/combination:	LoadCase1 👻	Design torsion:	2.328754966640			
Reinforcement layer	s			1 1		
NoOfBars	BarDiameter	depth	IsBottomLayer	Cover left:		Cover right:
• 4	0.012	0	v	0.025		0.025
Required Asteel top	0.012	0 Actual Asteel top:	0.00045238934;	Cover botte	m: 0.025	Refresh
Required Asteel top Required Asteel bot Bending bottom: L	0.012 : 0	0 Actual Asteel top: Actual Asteel bottor Add reinfic	0.00045238934; n 0.00045238934; rcement layer	Cover botto	m: 0.025	Refresh
Required Asteel top Required Asteel bot Bending bottom: L Bending top: S	0.012 : 0 tom: 0.000767135995 inSafe	0 Actual Asteel top: Actual Asteel bottor Add reinfo	0.000452389341 n (0.000452389341 n (0.000452389341) preement layer	Cover botta	m: 0.025	Refresh
Required Asteel top Required Asteel bot Bending bottom: U Bending top: S Stirrups	0.012 : 0 tom: 0.00076713599: inSafe afe	0 Actual Asteel top: Actual Asteel bottor Add reinfo	0.000452389345 n (0.000452389345 n (0.000452389345) rrcement layer	Cover botta Longitudinal rebars BarDiameter 0	m: 0.025	Refresh Ybar 0
Required Asteel top Required Asteel bot Bending bottom: L Bending top: S Stirrups Width	0.012 : 0 tom: 0.000767135999 infsafe afe NoOfLegs	0 Actual Asteel top: Actual Asteel bottor Add reinfo	0.000452389341 0.000452389341 proement layer BarSpacing	Cover botto Longitudinal rebars BarDiameter > 0	m: 0.025	Refresh Ybar 0
Required Asteel top Required Asteel bot Bending bottom: L Bending top: S Stirrups Width > 0.2	0.012 0.00767135999 insafe NoOfLegs 2	0 Actual Asteel top: Actual Asteel bottor Actual Asteel bottor Add reinfo BarDiameter 0.008	0.00045238934; m (0.00045238934; m (0.00045238) m (0.0004	Cover botto	m: 0.025	Refresh Ybar 0

Insert the Number of bars, Bar diameter, Depth for flexure reinforcement

The width, Number of legs, Bar diameter, Spacing for stirrups

& the bar diameter, Xbar, Ybar for longitudinal bar

Design beams:				
Design Beam1 Design Beam2		Show enabl	ed.	Read beam data
Design Beam3		De euro contratile o	0.25	
Design Beam5			0.25	Define design regions
Design Beam6	E	Beam depth:	0.7	
Design Beam8		Solved.	Solved	Start beam design
Design Beam9 Design Beam10				
ocolgi i occimizo				
Design Beam11	•			Close
Design Beam11	•		-	Close
esign Beam11 xporting Would you like to es Yes Export path: C:	xport calc	ulation sheets	of the designed e	Close Sements?

Start beam design & Export calculation sheets for designed element.



Shear Design for Design Beam 1 Section A



Flexure Design for Design Beam 1 Section A

We can export the design data to be shown as excel sheet for beams details





Press on Export design data from file menu then choose the Design beams, mark on Export beams then Export.



After design and export the calculation sheets, we are going to show the slab details from the detailing menu

