CON						Job No.	Sheet No		Rev.
	SULTING N E E R S			n Sheet		jXXX		1	
ENGI		consulting	Linginicers			Member/Locatio		T	
lob Titlo	Mombor D	ncian Doin	forced Con	crota One V	Vay Caapai	Drg.	n		
	esign - RC (	_		crete One V b	vay Spanni	, ,	C Date 2	L/11/2021	¢hd.
Hember De				5			<u> </u>	., , 2021	•
Material P	roperties								
				2					
				N/mm <sup>2</sup> ; HS	SC N/A)		35 🔻	N/mm <sup>2</sup>	ОК
	gth of longi		1					N/mm <sup>2</sup>	
	gth of shea ncrete and		Т <sub>уv</sub>		Nerroal			N/mm <sup>2</sup>	
Type of col		uensity, p <sub>c</sub>			Normal	veignt	2	4 kN/m <sup>3</sup>	
Slab Para	meters								
Effective sp	oan of slab	and numbe	r, I (numbe	r affects sla	ab mMulti Sp	an 🗖	5.00	) m	
				ber affects			6.00		
Slab suppo	ort condition	s (affects e	effective bea	am section,	moi Continua	ous - Continu	ous End 🔻	ia)	
-				shear for o				•	
case, supp	orts for bea	m and edge	e beam and	l whether ir	nterior or ea	dge beam	for both pre	ecast and co	ntinuous ca
				/36 cont; l/				) mm	
				AX(25, φ) in		external)		) mm	
				cover - $\phi_s/2$				1 mm	
Effective de	epth to hog	ying steel,	$u_h = n_{slab} -$	cover - $\phi_{link}$	-φ <sub>h</sub> /∠		20	2 mm	
Sagaina st	eel reinforc	ement diam	latar d				12 🔻	' mm	
	eel reinforc							) mm	
	eel area pro	•		/4)/n				mm²/m	
	eel reinforc			/+)/Ps				/ mm	
	eel reinforc							) mm	
	eel area pro	•		<sup>2</sup> /4)/n <sub>b</sub>				mm²/m	
	p ··	s,pi						,	
Shear link	diameter, ø	link					None	' mm	
	links per m						1	<mark>)</mark> /m	
Area provio	ded by all li	nks per me	tre, A <sub>sv,prov</sub>	= n <sub>link</sub> .π.φ <sub>link</sub>	<sup>2</sup> /4			0 mm²/m	
Pitch of lin	ks, S						20	<mark>)</mark> mm	
								_	
	ing (Plan				Elastic Mome				
•		t on beam i	must be che	ecked on ef	fective widt	ths [span/(		within slab	depth)
Live load, L							_	) kPa	
	sed dead lo						_	) kPa	
	of slab, DL		(n) = 1.4 (n)	L + SDL <sub>plan</sub>	) _ 1 6 ! !		6.0 <b>40.4</b>	) kPa	
ULS SIdD 10	auni <b>y,</b> ω <sub>ULS</sub>	, <sub>slab</sub> (a.ĸ.a.	ii) – 1.4 (D		) T 1.0 LL		40.4	Krd	
Beam I oa	ding (Elev	ation Loar	lina)		Elastic Momer	nts Effects		•	
Superimpo	sed dead lo	ad on bean	n, SDLelev ba	am			0.0	) kN/m	
Edge Load	ding (Eleva	ation Load	ing)		Elastic Momer	nts Effects	•	,	
Superimpo	sed dead lo	ad on edge	, SDL <sub>elev,edg</sub>	e			0.0	) kN/m	
									ļ

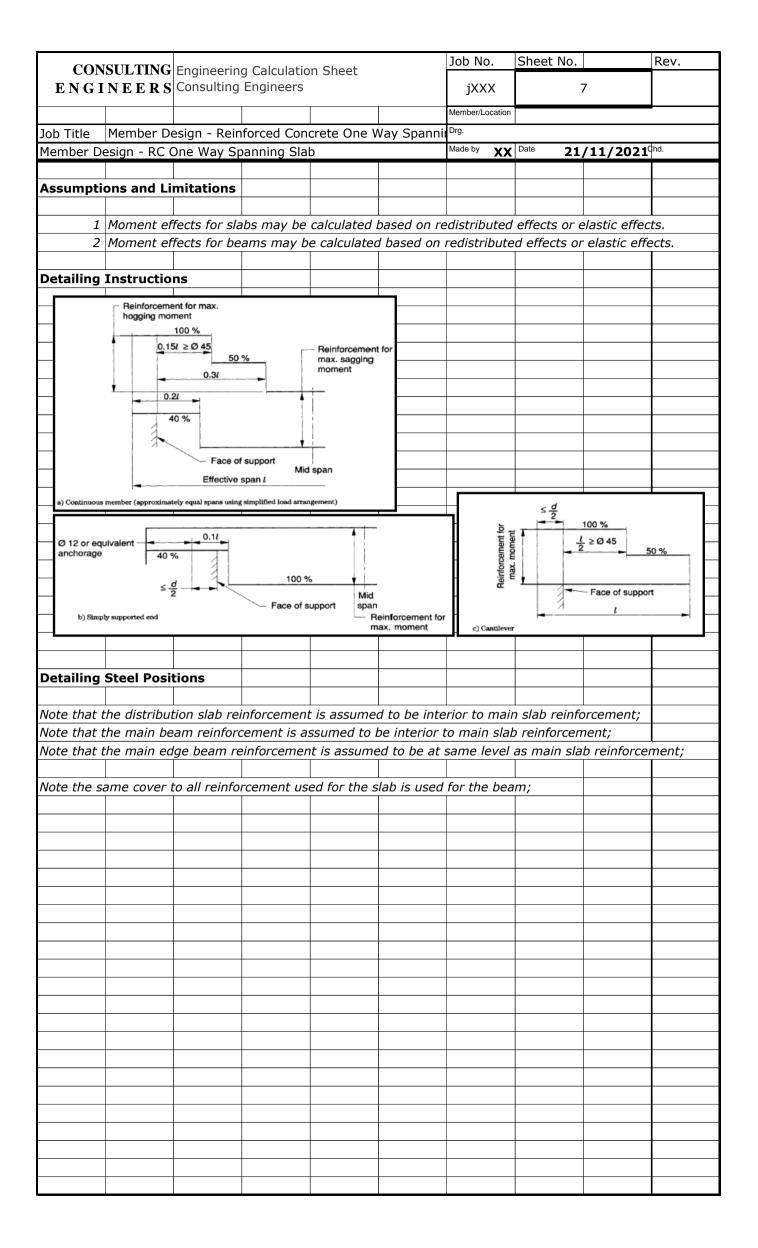
						Job No.		Sheet No.		Rev.
			g Calculatio	n Sheet						
ENGINE	EKS	Consulting	Engineers			jXXX		-	2	
						Member/Loc	ation			
Job Title Men	nber De	esign - Rein	forced Cond	crete One V	Vay Spannii	Drg.				
Member Design	n - RC C	)ne Way Sp	anning Slal	0		Made by	XX	Date 21	/11/2021	hd.
Parameters of	f Beam									
Interior or edge								Edge Beam		
(affects tributa					eam spacir	ng for ef	rect			
Downstand dep			ding slad),	N <sub>d,beam</sub>				1000		
Width of beam, Dead load on b			). – h.	b. o					mm kN/m	
Sag moment be			beam — I'd,i	beam¤w,beamP	c				kNm	
Hog moment be									kNm	
Shear beam, $V_{t}$		hog,beam						371		
	beam							5/1		
Span (for effect	tive wid	Ith and def	ection calcs	5) = l <sub>b</sub>				6.000	m	
Available beam					ous case) =	- -		2.500		
Sag section typ				25			L -	continuous		
Hog section typ								continuous		
Overall depth,		lownstand i	f precast, d	lownstand ·	+ slab if cor			1250	mm	
, ,			. , .		_	_				
For sagging: te	nsion s	teel diamet	er, $\phi_{t,sag}$ and	d number		25	▼	6		
For sagging: co					ber	None	•	0		
For sagging: ac			1	5		]		16	mm	
For hogging: te	ension s	teel diamet	er, $\phi_{t,hog}$ an	d number		25	-	6		
For hogging: ac	dd cove	r to tensile	steel, cove	$r_{add,t,hog} = c$	cover <sub>add,c,sag</sub>	]		16	mm	
For hogging: co	ompress	sion steel d	iameter, φ <sub>c,</sub>	<sub>hog</sub> and nun	nber	None	◄	0		
Link diameter $\phi$	o <sub>link</sub> , nur	nber and p	itch		10 🔻		2	200	mm	
For sagging: nu									layer(s)	
For sagging: nu									layer(s)	
Ratio $\beta_b = 1.2$ (s							1.0			
For hogging: nu									layer(s)	
For hogging: nu	umber o	of layers of	compressio	on steel, n <sub>la</sub>	yers,comp,hog			1	layer(s)	
	1									
					1	1				

						Job No.	Sheet No.		Rev.
	SULTING	-	-	on Sheet					(CV.
ENGI	NEERS	Consulting	Engineers			jXXX		3	
						Member/Location	ı		
Job Title	Member De	esign - Rein	forced Con	crete One V	/ay Spanni	Drg.			
	esign - RC C				, .	Made by XX	C Date 21	/11/2021 <sup>Ch</sup>	d.
Paramete	rs of Edge	Beam							
	edge bean						Yes 🔻		
(obtains re	levant valu	es from the	two sectio	ns below)					
				th downstar	nd), b <sub>w,edge</sub>		-	mm	
	on edge bea							kN/m	
	nt edge bea nt edge bea							kNm kNm	
	e beam, V <sub>ed</sub>		e				_	kN	
	e Deam, v <sub>ed</sub>	ge					47	KIN	
Span (for e	effective wid	th and def	lection calco	s) = l			5.000	m	
				s in continu	ous case) =	= I <sub>b</sub> /2	3.000		
Sag sectior						-	continuous	+	
Hog section							continuous		
Overall dep							1250		
Effective w	idth, $b_{eff} =$	span/10 if s	single span	, span/14.2	9 if multi-s	pan	350	mm	
Dead load	excluding d	ownstand,	$\omega_{edge,DL} = (t$	o <sub>eff</sub> or b <sub>w,edge</sub>	+ b <sub>eff</sub> ).h <sub>sla</sub>	ıb Ρc	3.90	kN/m	
	With Dow	nstand De	pth						
				(excluding s	lab), h <sub>d,edge</sub>	2	1000		
		lge beam, l	, 5		- L - L		_	mm	
	Dead load	on edge be	am downsta	and, DL <sub>edge</sub>	$= n_{d,edge} b_{w,r}$	edgePc	/.20	kN/m	
	Sag sectior						· continuous		
	Hog section						continuous		
	-		lownstand i	f precast, de	ownstand -		1		
		ven, neage (a			ownocana		1250		
	Without D	ownstand	Depth						
	Downstand	l depth of e	dge beam (	(excluding s	lab), h <sub>d.edge</sub>	= 0.0	0	mm	
		dge beam, l					0	mm	
				and, DL <sub>edge</sub>	= 0.0			kN/m	
	Sag sectior					Rect -	continuous		
	Hog section					Rect -	continuous		
	Overall dep	oth, h <sub>edge</sub> (s	lab)				250	mm	
							_		
	g: tension s					20 🔻	6		
⊦or sagging	g: compress	sion steel di	lameter, φ <sub>c,</sub>	<sub>sag</sub> and num	ber	None 🔻	0	ļļ	
Faulta:									
	g: tension s				bor .	20	6		
				<sub>,hog</sub> and num		None 🔻	0	mm	
∟шк шате	ter <sub>þlink</sub> , nur	nber and p			10 💌	4	200	mm	
For segain	1. number (	of lavers of	tensile stor	el, n <sub>layers,tens,</sub>			2	layer(s)	
				on steel, n <sub>layers,tens</sub> ,				layer(s)	
				ess single sp		1.0			
				el, n <sub>layers,tens,</sub>		1.(		layer(s)	
				on steel, n <sub>lay</sub>				layer(s)	
	<u>.</u>				vers,comp,hog		1		
Note b ar is	s the assum	ned (insitu)	continuous	(without de	ownstand)	edge bear	n width in th	e case of pre	cast slał
		(				<u> </u>			
			I	1		1	I		

Member Design - RC One Way Spanning Slab       Made by       XX       Date       21/11/2021 <sup>chd.</sup> Utilisation Summary (Slab)       UT       Remark       Image: Constraint of the stress of the stre	CONSULTING Engineering Calculation Sheet Consulting Engineers         jXXX       4         Job Title       Member Design - Reinforced Concrete One Way Spannin Member Design - RC One Way Spanning Slab       Mede by       XX       Date       21/11/2021 <sup>chc</sup> Member Design - RC One Way Spanning Slab       Mede by       XX       Date       21/11/2021 <sup>chc</sup> Utilisation Summary (Slab)       Mede by       XX       Date       21/11/2021 <sup>chc</sup> Item       UT       Remark       I       I       I         Sag moment, Ms       86%       OK       I       I         Hog moment, Mh       80%       OK       I       I         % Min sag reinforcement       29%       OK       I       I         Willimate shear stress       10%       OK       I       I         Deflection requirements       91%       OK       I       I         Total utilisation continuous slab       91%       OK       I       I         Utilisation Summary (Beam)       I       I       I       I       I	-
Job Title       Member Design - Rc One Way Spanning Slab         Witilisation Summary (Slab)       Utilisation Summary (Slab)       Member Design - RC One Way Spanning Slab       Member Design - RC One Way Spanning Slab       Member Design - RC One Way Spanning Slab         Item       UT       Remark       Sag moment, M,       86%       OK         % Min sag reinforcement       29%       OK       OK       Sag moment, M,       Sag m	Image: Second	
Job Title       Member Design - Reinforced Concrete One Way Spanni       Deg         Member Design - RC One Way Spanning Slab       Medesy       XX       Dies       21/11/2021 <sup>(but)</sup> Utilisation Summary (Slab)       UT       Remark       Remark       Image: State	Job Title Member Design - Reinforced Concrete One Way Spanni Member Design - RC One Way Spanning Slab Made by XX Date 21/11/2021 <sup>Chc</sup> Utilisation Summary (Slab) Utilisation Summer, Ms Sag moment, Ms Hog moment, Mh Made by XX Date 21/11/2021 <sup>Chc</sup> UT Remark Sag moment, Ms Hog moment, Mh Min sag reinforcement Member Design capacity Deflection requirements Deflection requirements Deflection requirements Deflection requirements Member Design capacity Deflection requirements Deflection requirements Deflection requirements Deflection requirements Deflection requirements Member Design capacity Deflection requirements Member Design capacity Deflection requirements Member Design capacity Deflection requirements Member Design capacity Member Des	.t.
Job Title       Member Design - Rc One Way Spanning Slab       Mede by       XX       Date       21/11/2021 <sup>©</sup> Md         Member Design - RC One Way Spanning Slab       Mede by       XX       Date       21/11/2021 <sup>©</sup> Md         Utilisation Summary (Slab)       UT       Remark       Remark       Remark         Sag moment, M <sub>b</sub> 86%       OK       OK       Remark         Hog moment, M <sub>b</sub> 80%       OK       CK       Remark         Witimate shear stress       10%       OK       CK       CK         Utimate shear stress       10%       OK       CK       CK         Deflection requirements       91%       OK       CK       CK         Total utilisation continuous slab       91%       OK       CK       CK         Utilisation Summary (Beam)       UT       Detailing requirements       CK       CK       Etem Hog         Ream sagging       35%       OK       CK       Etem Hog       Etem Hog       Etem Hog       Etem Hog       Etem Hog         Overall utilisation Summary       CK       CK       CK       Etem Hog	Job Title Member Design - Reinforced Concrete One Way Spanni Member Design - RC One Way Spanning Slab Made by XX Date 21/11/2021 <sup>Chc</sup> Utilisation Summary (Slab) Utilisation Summer, Ms Sag moment, Ms Hog moment, Mh Made by XX Date 21/11/2021 <sup>Chc</sup> UT Remark Sag moment, Ms Hog moment, Mh Min sag reinforcement Member Design capacity Deflection requirements Deflection requirements Deflection requirements Deflection requirements Member Design capacity Deflection requirements Deflection requirements Deflection requirements Deflection requirements Deflection requirements Member Design capacity Deflection requirements Member Design capacity Deflection requirements Member Design capacity Deflection requirements Member Design capacity Member Des	d.
Member Design - RC One Way Spanning Slab       Made by       XX       Date       21/11/2021 <sup>ch/</sup> Wember Design - RC One Way Spanning Slab       UT       Remark       Sag moment, Mage by       XX       Date       21/11/2021 <sup>ch/</sup> Utilisation Summary (Slab)       UT       Remark       Sag moment, Mage by       S	Member Design       Reinforced contects one way Spanning         Member Design       RC One Way Spanning Slab         Utilisation       Summary (Slab)         Item       UT         Remark       Image by XX         Sag moment, Ms       86%         Hog moment, Mh       80%         % Min sag reinforcement       29%         % Min hog reinforcement       16%         Wittimate shear stress       10%         Shear design capacity       55%         Deflection requirements       91%         Otal utilisation precast slab       91%         Detailing requirements       0K         Utilisation Summary (Beam)       Image by XX	d.
Utilisation Summary (Slab)       UT       Remark         Sag moment, Ms,       86%       OK         Hog moment, Mh,       80%       OK         % Min sag reinforcement       29%       OK         % Min hog reinforcement       16%       OK         % Min hog reinforcement       16%       OK         Utimate shear stress       10%       OK         Deflection requirements       91%       OK         Deflection constituous slab       91%       OK         Detailling requirements       0K       0K         Utilisation Drecast slab       91%       OK         Detailling requirements       0K       0K         Utilisation Summary (Beam)       All Beams         Automatic design       35%       OK         Edge beam hogging       35%       OK         Edge beam hogging       35%       OK         Edge beam hogging       35%       OK         Overall utilisation       91%       OK         Overall utilisation       91%       OK         Overall utilisation       91%       OK         Overall utilisation       91%       0K         Overall utilisation       91%       0K	Item	
Item       UT       Remark         Sag moment, Ms       86%       OK         Hog moment, Mh       80%       OK         % Min sag reinforcement       29%       OK         Witimate shear stress       10%       OK         Deflection requirements       91%       OK         Deflection requirements       91%       OK         Total utilisation continuous slab       91%       OK         Detailing requirements       0K       0K         Utilisation Summary (Beam)       0K       0K         Item       UT       Detailing Remark         Beam sagging       35%       OK         Edge beam sagging       35%       OK         Overall utilisation Summary       0       0K         Edge beam hogging       35%       OK         Overall utilisation       91%       0K         Overall utilisation       91%       0K         Overall detailing requirements       0K       0K         Withisation Summary       0K       0K         We sagging reinforcement       0.45       %         % Sagging reinforcement       0.45       %         % Sagging reinforcement       0.45       %	ItemUTRemarkSag moment, Ms86%0KHog moment, Mh80%0K% Min sag reinforcement29%0K% Min hog reinforcement16%0K% Min hog reinforcement16%0KUltimate shear stress10%0KShear design capacity55%0KDeflection requirements91%0KTotal utilisation precast slab91%0KDetailing requirements00KUtilisation Summary (Beam)00Utilisation Summary (Beam)00Utilisation Summary (Beam)00Utilisation Long Long Long Long Long Long Long Lo	
Item       UT       Remark         Sag moment, Ms       86%       OK         Hog moment, Mh       80%       OK         % Min sag reinforcement       29%       OK         Witimate shear stress       10%       OK         Deflection requirements       91%       OK         Deflection requirements       91%       OK         Total utilisation continuous slab       91%       OK         Detailing requirements       0K       0K         Utilisation Summary (Beam)       0K       0K         Item       UT       Detailing Remark         Beam sagging       35%       OK         Edge beam sagging       35%       OK         Overall utilisation Summary       0       0K         Edge beam hogging       35%       OK         Overall utilisation       91%       0K         Overall utilisation       91%       0K         Overall detailing requirements       0K       0K         Withisation Summary       0K       0K         We sagging reinforcement       0.45       %         % Sagging reinforcement       0.45       %         % Sagging reinforcement       0.45       %	Item       UT       Remark         Sag moment, Ms       86%       0K         Hog moment, Mh       80%       0K         % Min sag reinforcement       29%       0K         % Min hog reinforcement       16%       0K         Ultimate shear stress       10%       0K         Ultimate shear stress       10%       0K         Deflection requirements       91%       0K         Total utilisation precast slab       91%       0K         Detailing requirements       0       0K         Utilisation Summary (Beam)       0       0	
Sag moment, Ms,       86%       OK         Hog moment, Mh,       80%       OK         % Min sag reinforcement       29%       OK         % Min hog reinforcement       16%       OK         Ultimate shear stress       10%       OK         Ultimate shear stress       10%       OK         Deflection requirements       91%       OK         Total utilisation precast slab       91%       OK         Total utilisation continuous slab       91%       OK         Detailing requirements       0K       0K         Utilisation Summary (Beam)       0K       0K         Item       UT       Detailing Remark         Beam sagging       35%       OK         Beam sagging       35%       OK         Edge beam sagging       35%       OK         Edge beam hogging       35%       OK         Overall utilisation Summary       0K       Eteam Sag         % Sagging reinforcement       0.41       91%         % Sagging reinforcement       0.45       %         % Sagging reinforcement       0.45       %         % Sagging reinforcement       0.45       %         % Sagging reinforcement       0.45	Sag moment, Ms       M       86%       OK       Image: Sag moment, Mh       80%       OK       Image: Sag moment, Mh       80%       OK       Image: Sag moment, Mh       80%       OK       Image: Sag moment, Mh       Image: Sag moment, Mh       80%       OK       Image: Sag moment, Mh       Image: Sag moment, Mh       Image: Sag moment, Mh       80%       OK       Image: Sag moment, Mh       Image:	
Sag moment, Ms,       86%       OK         Hog moment, Mh,       80%       OK         % Min sag reinforcement       29%       OK         % Min hog reinforcement       16%       OK         Ultimate shear stress       10%       OK         Ultimate shear stress       10%       OK         Deflection requirements       91%       OK         Total utilisation precast slab       91%       OK         Total utilisation continuous slab       91%       OK         Detailing requirements       0K       0K         Utilisation Summary (Beam)       0K       0K         Item       UT       Detailing Remark         Beam sagging       35%       OK         Beam sagging       35%       OK         Edge beam sagging       35%       OK         Edge beam hogging       35%       OK         Overall utilisation Summary       0K       Eteam Sag         % Sagging reinforcement       0.41       91%         % Sagging reinforcement       0.45       %         % Sagging reinforcement       0.45       %         % Sagging reinforcement       0.45       %         % Sagging reinforcement       0.45	Sag moment, MsImage: MsMinicities Minicities Miniciti	
Hog moment, M, % Min sag reinforcement80% 29%OK OK% Min hog reinforcement16% 0 KOK% Min hog reinforcement16% 0 KOKUltimate shear stress10% Shear design capacity55% 0 KOKDeflection requirements91% 0 KOKTotal utilisation precast slab91% 0 KOKTotal utilisation continuous slab91% 0 KOKDetailing requirements0KMatinization precast slab91% 0 KDetailing requirements0KMutomatic designAll BeamsAutomatic design35% 35%Edge beam sagging Edge beam sagging35% 35%Overall Utilisation Summary0KOverall Utilisation Summary91% 91%Overall Utilisation Summary0KOverall Utilisation Summary0K0Verall Utilisation Summary0K0Verall Utilisation Summary0K0K91% 91%0Verall Utilisation Summary0K0Verall Utilisation Summary0K0Verall Utilisation Summary0K	Hog moment, MhImage: MhMin	
% Min sag reinforcement29%OK% Min hog reinforcement16%OKUltimate shear stress10%OKShear design capacity55%OKDeflection requirements91%OKTotal utilisation precast slab91%OKTotal utilisation continuous slab91%OKDetlection requirementsOKOKUtilisation Summary (Beam)OKOKItemUTDetailing PetailingRemarkS5%OKBeam sagging35%OKBeam sagging35%OKEdge beam sagging35%OKEdge beam hogging35%OKOverall utilisation91%OKVerall utilisation91%OKBeam flog35%OKBeam sagging35%OKBeam sagging35%OKEdge beam sagging35%OKOverall utilisation91%Overall utilisation91%Overall detailing requirementsOK% Sagging reinforcement0.45% Sagging reinforcement0.45% Hogging reinforcement0.45% Sagging reinforcement quantity (130 - 220kg/m³)99kg/m³[f 2.5. ( $A_{s,prov,s} + A_{s,prov,h}$ ) / $h_{sab}$ ]; No curtailment; No laps; Links ignored; Distribution steel ignoresEstimated steel reinforcement quantity (130 - 220kg/m³)157kg/m³[f 2.5. ( $A_{s,prov,s} + A_{s,prov,h$ ) / $h_{sab}$ ]; Curtailment; Laps; Links ignored; Distribution steel; <t< td=""><td>% Min sag reinforcement       29%       OK       Image: constraint of the second sec</td><td></td></t<>	% Min sag reinforcement       29%       OK       Image: constraint of the second sec	
% Min hog reinforcement       16%       OK         Ultimate shear stress       10%       OK         Deflection requirements       91%       OK         Total utilisation precast slab       91%       OK         Detailing requirements       91%       OK         Utilisation continuous slab       91%       OK         Detailing requirements       0K       0K         Utilisation Summary (Beam)       0K       0K         Automatic design       All Beams       0K         Beam sagging       35%       0K         Beam sagging       35%       0K         Edge beam sagging       35%       0K         Overall Utilisation Summary       0       0K         Beam logging       35%       0K         Overall Utilisation Summary       0K       0K         Overall Utilisation Summary       0.4       0.45         % Sagging reinforcement       0.45       %         % Hogging reinforcement       0.80       %         % Hogging reinforcement       0.	% Min hog reinforcement16%OK $\sim$ Ultimate shear stress10%0K10%0K10%Shear design capacity55%0K55%0K10%Deflection requirements91%0K10%10%10%Total utilisation precast slab91%0K10%10%10%Total utilisation continuous slab91%0K10%10%10%Detailing requirements00K0K10%10%10%Utilisation Summary (Beam)10%10%10%10%10%10%	
Ultimate shear stress       10%       OK         Shear design capacity       55%       OK         Deflection requirements       91%       OK         Total utilisation precast slab       91%       OK         Detailing requirements       91%       OK         Detailing requirements       0K       0K         Utilisation Continuous slab       91%       OK         Detailing requirements       0K       0K         Utilisation Summary (Beam)       All Beams       0K         Item       UT       Detailing Remark       0K         Beam sagging       35%       0K       0K         Edge beam hogging       35%       0K       0K         Edge beam hogging       35%       0K       0K         Overall utilisation       91%       0K       EBeam Sag         Overall utilisation       91%       0K       0K         Overall utilisation       91%       0K       0K         Stimated steel reinforcement       0.80       %       0K         % Sagging reinforcement       0.80       %       0K       0K         Stimated steel reinforcement quantity (130 - 220kg/m³)       157       kg/m³       157ructE	Ultimate shear stressImage: stress<	
Shear design capacity55%OKDeflection requirements91%OKTotal utilisation precast slab91%OKTotal utilisation continuous slab91%OKDetailing requirementsOKUtilisation Summary (Beam)Image: Control of the state	Shear design capacity       55%       OK         Deflection requirements       91%       OK         Total utilisation precast slab       91%       OK         Total utilisation continuous slab       91%       OK         Detailing requirements       OK       OK         Utilisation Summary (Beam)       Image: Continuous slab       Image: Continuous slab	
Deflection requirements       91%       OK         Total utilisation precast slab       91%       OK         Total utilisation continuous slab       91%       OK         Detailing requirements       OK         Utilisation Summary (Beam)       OK         Automatic design       All Beams         Beam sagging       35%       OK         Beam hogging       35%       OK         Edge beam sagging       35%       OK         Overall utilisation Summary       Overall detailing requirements       Ok         Overall utilisation       91%       OK         Øverall detailing requirements       Ok       Ok         % Sagging reinforcement       0.45       %         % Sagging reinforcement       0.45       %         % Sagging reinforcement       0.45       %         % Hogging reinforcement       0.45       %         % Sagging reinforcement       0.45       %         % Hogging reinforcement       0.45       %         % Sagging reinforcement       0.45	Deflection requirements       91%       OK         Total utilisation precast slab       91%       OK         Total utilisation continuous slab       91%       OK         Detailing requirements       0K       0K         Utilisation Summary (Beam)       Image: Continuous slab       Image: Continuous slab	
Total utilisation precast slab       91%       OK         Total utilisation continuous slab       91%       OK         Detailing requirements       OK       OK         Utilisation Summary (Beam)       All Beams       Image: Control of the state design       All Beams         Item       UT       Detailing Remark       Beam Sag       Beams Sag         Beam sagging       35%       OK       OK       Beam Sag         Edge beam sagging       35%       OK       OK       Beam Hog         Edge beam sagging       35%       OK       OK       Beam Hog         Overall Utilisation Summary       Image: Control of the state design       Image: Control of the state design       Image: Control of the state design         Øverall Utilisation Summary       Image: Control of the state design       Image: Control of the state design       Image: Control of the state design         %       Sagging reinforcement       Image: Control of the state design       Image: Control of the state design       Image: Control of the state design         %       Sagging reinforcement quantity (130 – 220kg/m³)       Image: Control of the state design       Image: Control of the state design       Image: Control of the state design         %       Suprov.s + A suprov.h) / h stab J: Control ment: No laps; Links ignored; Distribution steel;       INote t	Total utilisation precast slab       91%       OK         Total utilisation continuous slab       91%       OK         Detailing requirements       OK       OK         Utilisation Summary (Beam)       Image: Continuous slab       Image: Continuous slab	
Total utilisation continuous slab       91%       OK         Detailing requirements       OK         OK       OK         Utilisation Summary (Beam)       Image: Control of the second s	Total utilisation continuous slab     91%     OK       Detailing requirements     OK     OK       Utilisation Summary (Beam)     Image: Summary (Beam)     Image: Summary (Beam)	
Detailing requirements       OK         Utilisation Summary (Beam)       All Beams         Automatic design       All Beams         Automatic design       All Beams         Item       UT         Beam sagging       35%         Beam hogging       35%         Edge beam sagging       35%         Edge beam hogging       35%         Edge beam hogging       35%         Overall utilisation Summary       OK         Overall utilisation       91%         Overall detailing requirements       OK         % Sagging reinforcement       0.45         % Hogging reinforcement       0.45         % Hogging reinforcement       0.45         % Hogging reinforcement       0.45         % Hogging reinforcement       0.45         % Sagging reinforcement       0.45         % Sagging reinforcement       0.45         % Sagging reinforcement       0.45         % Hogging reinforcement       0.45         % Sagging reinforcement       0.45         % Sagging reinforcement quantity (130 – 220kg/m <sup>3</sup> )       157         Kg/m <sup>3</sup> IStructE         [12.5 . (A <sub>s,prov,s</sub> + A <sub>s,prov,h</sub> ) / h <sub>slab</sub> ]; Curtailment; Laps; Links ignored; Distribution steel ignored;	Detailing requirements     OK       Utilisation Summary (Beam)	
Utilisation Summary (Beam)       All Beams         Automatic design       All Beams         Automatic design       UT         Detailing       Remark         Beam sagging       35%         Beam hogging       35%         Edge beam sagging       35%         Edge beam hogging       35%         Edge beam hogging       35%         Overall utilisation Summary       Etage is a sagging reinforcement         Overall detailing requirements       OK         % Sagging reinforcement       0.45         % Hogging reinforcement       0.45         % Hogging reinforcement       0.45         % Hogging reinforcement       0.40         % Sagging reinforcement       0.45         % Sagging reinforcement       0.45         % Sagging reinforcement       0.45         % Sagging reinforcement       0.45         %       1; No curtailment; No laps; Links ignored; Distribution steel ignore         Estimated steel reinforcement quantity (130 – 220kg/m³)       157         Kg/m³       IStructE         [ 12.5 . (A <sub>s,prov,s</sub> + A <sub>s,prov,h</sub> ) / h <sub>stab</sub> ]; Curtailment; Laps; Links ignored; Distribution steel;         [Note that steel quantity in kg/m³ can be obtained from 125.0 x % rebar];         Material cost:	Utilisation Summary (Beam)	
Automatic designUTDetailing Remark OKBeamsItemUTDetailing Remark OKBeam SagBeam sagging35%OKOKBeam hogging35%OKOKEdge beam sagging35%OKOKEdge beam hogging35%OKOKEdge beam hogging35%OKOKEdge beam hogging35%OKOKEdge beam hogging35%OKOKEdge beam hogging35%OKOKOverall utilisation91%Image: Comparison of the second of		
Automatic designUTDetailing Remark OKBeamsItemUTDetailing Remark OKBeam SagBeam sagging35%OKOKBeam hogging35%OKOKEdge beam sagging35%OKOKEdge beam hogging35%OKOKEdge beam hogging35%OKOKEdge beam hogging35%OKOKEdge beam hogging35%OKOKEdge beam hogging35%OKOKOverall utilisation91%Image: Comparison of the second of		
ItemUTDetailing NoRemark NoBeam SagBeam hogging $35\%$ OKOKBeam MogEdge beam sagging $35\%$ OKOKBeam MogEdge beam hogging $35\%$ OKOKBeam MogEdge beam hogging $35\%$ OKOKEBeam SagEdge beam hogging $35\%$ OKOKEBeam SagCoverall Utilisation SummaryImage: Constraint of the second secon		
ItemUTDetailing NoRemark NoBeam SagBeam hogging $35\%$ OKOKBeam MogEdge beam sagging $35\%$ OKOKBeam MogEdge beam hogging $35\%$ OKOKBeam MogEdge beam hogging $35\%$ OKOKEBeam SagEdge beam hogging $35\%$ OKOKEBeam SagCoverall Utilisation SummaryImage: Constraint of the second secon		
Beam sagging35%OKOKBeam SagBeam hogging35%OKOKBeam HogEdge beam sagging35%OKOKBeam HogEdge beam hogging35%OKOKEBeam SagEdge beam hogging35%OKOKEBeam HogOverall Utilisation SummaryImage: Signal Sig	Automatic design	
Beam sagging35%OKOKBeam SagBeam hogging35%OKOKBeam HogEdge beam sagging35%OKOKBeam HogEdge beam hogging35%OKOKEBeam SagEdge beam hogging35%OKOKEBeam HogOverall Utilisation SummaryImage: Signal Sig		
Beam hogging $35\%$ $0K$ $0K$ $0K$ $Beam Hog$ Edge beam sagging $35\%$ $0K$ $0K$ $0K$ $0K$ $0K$ $Beam Hog$ Edge beam hogging $35\%$ $0K$ $0K$ $0K$ $EBeam Sag$ Edge beam hogging $35\%$ $0K$ $0K$ $EBeam Mog$ Overall Utilisation Summary $15\%$ $0K$ $0K$ $15\%$ Overall utilisation $91\%$ $0K$ $15\%$ $15\%$ $0verall detailing requirements0.45\%15\%\% Sagging reinforcement0.45\%\%\% Hogging reinforcement0.45\%35\%\% Hogging reinforcement0.45\%35\%17.850 \cdot (A_{s,prov,s} + A_{s,prov,h}) / h_{slab}157kg/m^315tructE[12.5 \cdot (A_{s,prov,s} + A_{s,prov,h}) / h_{slab}15tructE15tructE125.0 \times \% rebar];[Note that steel quantity in kg/m^3 can be obtained from 125.0 x % rebar];units/tonne$		
Edge beam sagging35 %OKOKEdge beam hogging35%OKOKEdge beam hogging35%OKOKElge beam hogging35%OKOKOverall Utilisation SummaryImage: Signal S		
Edge beam hogging35%OKOKEBeam HogOverall Utilisation SummaryImage: state state steel reinforcement quantity (130 - 220kg/m³)91%Image: state steel reinforcement quantity (130 - 220kg/m³)99kg/m at state steel reinforcement quantity (130 - 220kg/m³)99kg/m³IfstructEImage: state steel reinforcement quantity (130 - 220kg/m³)157kg/m³IfstructEImage: state steel quantity in kg/m³ can be obtained from 125.0 x % rebar];Image: state steel quantity in kg/m³ can be obtained from 125.0 x % rebar];Image: state steel quantity in kg/m³ can be obtained from 125.0 x % rebar];Image: state steel quantity in kg/m³ can be obtained from 125.0 x % rebar];Image: state steel quantity in kg/m³ can be obtained from 125.0 x % rebar];Image: state steel quantity in kg/m³ can be obtained from 125.0 x % rebar];Image: state state state state steel quantity in kg/m³ can be obtained from 125.0 x % rebar];Image: state steel qu		
Overall Utilisation SummaryImage: constraint of the second s		
Overall utilisation91%Overall detailing requirements0KOverall detailing requirements0K% Sagging reinforcement0.45% Hogging reinforcement0.45% Hogging reinforcement0.45% Hogging reinforcement0.80% Hogging reinforcement0.80% Sagging reinforcement0.80% Estimated steel reinforcement quantity (130 – 220kg/m³)99kg/m³157Estimated steel reinforcement quantity (130 – 220kg/m³)157Kg/m³157Kg/m³157Kg/m³157Kg/m³157Kg/m³157Kg/m³157Material cost:concrete, c180units/m³Material cost:0.180Material cost:0.180Material cost:0.180	Edge beam hogging 35% OK OK EBeam Hog	
Overall utilisation91%Overall detailing requirements0KOverall detailing requirements0K% Sagging reinforcement0.45% Hogging reinforcement0.45% Hogging reinforcement0.45% Hogging reinforcement0.80% Hogging reinforcement0.80% Sagging reinforcement0.80% Estimated steel reinforcement quantity (130 – 220kg/m³)99kg/m³157Estimated steel reinforcement quantity (130 – 220kg/m³)157Kg/m³157Kg/m³157Kg/m³157Kg/m³157Kg/m³157Kg/m³157Material cost:concrete, c180units/m³Material cost:0.180Material cost:0.180Material cost:0.180		
Overall detailing requirementsOK% Sagging reinforcement0.45% Hogging reinforcement0.45% Hogging reinforcement0.80% Hogging reinforcement0.80% Sagging reinforcement0.80% Hogging reinforcement quantity (130 – 220kg/m³)99kg/m³157[ 7.850 . ( $A_{s,prov,s} + A_{s,prov,h}$ ) / $h_{slab}$ ]; No curtailment; No laps; Links ignored; Distribution steel ignoredEstimated steel reinforcement quantity (130 – 220kg/m³)157Kg/m³IStructE[ 12.5 . ( $A_{s,prov,s} + A_{s,prov,h}$ ) / $h_{slab}$ ]; Curtailment; Laps; Links ignored; Distribution steel;[ Note that steel quantity in kg/m³ can be obtained from 125.0 x % rebar];Material cost:concrete, c180units/m³steel, s45004500units/tonne	Overall Utilisation Summary	
Overall detailing requirementsOK% Sagging reinforcement0.45% Hogging reinforcement0.45% Hogging reinforcement0.80% Hogging reinforcement0.80% Sagging reinforcement0.80% Hogging reinforcement quantity (130 – 220kg/m³)99kg/m³157[ 7.850 . ( $A_{s,prov,s} + A_{s,prov,h}$ ) / $h_{slab}$ ]; No curtailment; No laps; Links ignored; Distribution steel ignoredEstimated steel reinforcement quantity (130 – 220kg/m³)157Kg/m³IStructE[ 12.5 . ( $A_{s,prov,s} + A_{s,prov,h}$ ) / $h_{slab}$ ]; Curtailment; Laps; Links ignored; Distribution steel;[ Note that steel quantity in kg/m³ can be obtained from 125.0 x % rebar];Material cost:concrete, c180units/m³steel, s45004500units/tonne		
% Sagging reinforcement0.45% Hogging reinforcement0.45% Hogging reinforcement0.80% Estimated steel reinforcement quantity $(130 - 220 \text{ kg/m}^3)$ 99 $[7.850. (A_{s,prov,s} + A_{s,prov,h}) / h_{slab}]; No curtailment; No laps; Links ignored; Distribution steel ignoredEstimated steel reinforcement quantity (130 - 220 \text{ kg/m}^3)157[7.850. (A_{s,prov,s} + A_{s,prov,h}) / h_{slab}]; Curtailment; Laps; Links ignored; Distribution steel ignored[12.5. (A_{s,prov,s} + A_{s,prov,h}) / h_{slab}]; Curtailment; Laps; Links ignored; Distribution steel;[Note that steel quantity in kg/m^3 can be obtained from 125.0 x % rebar];Material cost:concrete, c180units/m³units/tonne$		
% Hogging reinforcement0.80%Estimated steel reinforcement quantity $(130 - 220 \text{kg/m}^3)$ 99kg/m³[7.850. ( $A_{s,prov,s} + A_{s,prov,h}$ ) / $h_{slab}$ ]; No curtailment; No laps; Links ignored; Distribution steel ignorEstimated steel reinforcement quantity $(130 - 220 \text{kg/m}^3)$ 157kg/m³[7.850. ( $A_{s,prov,s} + A_{s,prov,h}$ ) / $h_{slab}$ ]; Curtailment; Laps; Links ignored; Distribution steel ignor157[12.5. ( $A_{s,prov,s} + A_{s,prov,h}$ ) / $h_{slab}$ ]; Curtailment; Laps; Links ignored; Distribution steel;[Note that steel quantity in kg/m³ can be obtained from 125.0 x % rebar];Material cost:concrete, c180units/m³units/tonne		
% Hogging reinforcement0.80%Estimated steel reinforcement quantity $(130 - 220 \text{kg/m}^3)$ 99kg/m³[7.850. ( $A_{s,prov,s} + A_{s,prov,h}$ ) / $h_{slab}$ ]; No curtailment; No laps; Links ignored; Distribution steel ignored157kg/m³Estimated steel reinforcement quantity (130 - 220 kg/m³)157kg/m³IStructE[12.5. ( $A_{s,prov,s} + A_{s,prov,h}$ ) / $h_{slab}$ ]; Curtailment; Laps; Links ignored; Distribution steel;IStructE[Note that steel quantity in kg/m³ can be obtained from 125.0 x % rebar];units/tonneMaterial cost:concrete, c180units/m³steel, s	0.45 %	
Estimated steel reinforcement quantity $(130 - 220 \text{kg/m}^3)$ 99kg/m³[7.850. $(A_{s,prov,s} + A_{s,prov,h}) / h_{slab}$ ]; No curtailment; No laps; Links ignored; Distribution steel ignoreEstimated steel reinforcement quantity $(130 - 220 \text{kg/m}^3)$ 157kg/m³[12.5. $(A_{s,prov,s} + A_{s,prov,h}) / h_{slab}$ ]; Curtailment; Laps; Links ignored; Distribution steel;[Note that steel quantity in kg/m³ can be obtained from 125.0 x % rebar];Material cost:concrete, c180units/m³units/m³steel, s4500units/tonne		
[ 7.850 . $(A_{s,prov,s} + A_{s,prov,h}) / h_{slab}$ ]; No curtailment; No laps; Links ignored; Distribution steel ignoEstimated steel reinforcement quantity $(130 - 220 \text{kg/m}^3)$ <b>157</b> kg/m <sup>3</sup> IStructE[ 12.5 . $(A_{s,prov,s} + A_{s,prov,h}) / h_{slab}$ ]; Curtailment; Laps; Links ignored; Distribution steel;IStructE[ Note that steel quantity in kg/m <sup>3</sup> can be obtained from 125.0 x % rebar];Material cost:concrete, c180units/m <sup>3</sup> steel, s4500units/tonne		
Estimated steel reinforcement quantity $(130 - 220 \text{kg/m}^3)$ <b>157</b> kg/m³IStructE[ 12.5 . $(A_{s,prov,s} + A_{s,prov,h}) / h_{slab}$ ]; Curtailment; Laps; Links ignored; Distribution steel;IStructE[Note that steel quantity in kg/m³ can be obtained from 125.0 x % rebar];Material cost:concrete, c180units/m³steel, s4500units/tonne	$\begin{bmatrix} 2850 & (A + A - x) \\ b = 1 \end{bmatrix}$	steel ian
$\begin{bmatrix} 12.5 . (A_{s,prov,s} + A_{s,prov,h}) / h_{slab} \end{bmatrix}; Curtailment; Laps; Links ignored; Distribution steel; \\\begin{bmatrix} Note that steel quantity in kg/m3 can be obtained from 125.0 x % rebar]; \\\\ Material cost: concrete, c 180 units/m3 steel, s 4500 units/tonne \\\end{bmatrix}$		
[Note that steel quantity in kg/m³ can be obtained from 125.0 x % rebar];Material cost:concrete, c180units/m³steel, s4500units/tonne	Estimated steel reinforcement quantity $(130 - 220 \text{ kg/m})$	150 UCLE
Material cost: concrete, c 180 units/m <sup>3</sup> steel, s 4500 units/tonne		
Image: Concrete indector cost = [c + (cst + cost quart/s].hists)       IIII (S)III         Image: Concrete indector cost = [c + (cst + cost quart/s].hists)       IIII (S)III         Image: Concrete indector cost = [c + (cst + cost quart/s].hists)       Image: Concrete indector cost = [c + (cst + cost quart/s].hists)         Image: Concrete indector cost = [c + (cst + cost quart/s].hists)       Image: Concrete indector cost = [c + (cst + cost quart/s].hists)         Image: Concrete indector cost = [c + (cst + cost quart/s].hists)       Image: Concrete indector cost = [c + (cst + cost quart/s].hists)         Image: Concrete indector cost = [c + (cst + cost quart/s].hists)       Image: Concrete indector cost = [c + (cst + cost quart/s].hists)         Image: Concrete indector cost = [c + (cst + cost quart/s].hists)       Image: Concrete indector cost = [c + (cst + cost quart/s].hists)         Image: Concrete indector cost = [c + (cst + cost quart/s].hists)       Image: Concrete indector cost = [c + (cst + cost quart/s].hists)         Image: Concrete indector cost = [c + (cst + cost quart/s].hists)       Image: Concrete indector cost = [c + (cst + cost quart/s].hists)         Image: Concrete indector cost = [c + (cst + cost quart/s].hists]       Image: Concrete indector cost = [c + (cst + cost quart/s].hists]         Image: Concrete indector cost = [c + (cst + cost quart/s].hists]       Image: Concrete indector cost = [c + (cst + cost quart/s].hists]         Image: Concrete indector cost = [c + (cst + cost quart/s].hists]       Image: Concrete indector cost = [c + (cst + cost quart/s].hists]		
Image: state in the state in		
Image: state of the state o		
Image: state in the state in		
Image: state in the state		
Image: state in the state in		
Image: state in the state		
Image: state in the state in		
Image: state of the state of	Image:	
Image: state of the state of	Image: Sector of the sector	
Image: state of the state of	Image: state of the state	
Image: state of the state of	Image: state of the state	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Image: state of the state of	
Image: state of the state	Image: selection of the	
Image: state of the state	Image: selection of the	
Image: state of the state	Image: selection of the	
	Image: series of the series	
	Image: series of the series	
	Image: series of the series	

CON	SULTING	Enginoorin	a Calculati	on Shoot			Job No.	Sheet No.		Rev.
	N E E R S						jXXX		5	
Endi		eenearan.g		1			_		5	
							Member/Locatio	n		
Job Title		esign - Rein			e Way S	panni	Drg.	1		
Member D	esign - RC (	One Way Sp	anning Sla	b			Made by XX	( <sup>Date</sup> 21	/11/2021	hd.
Plan Layo	out									
Multi-Spa	n Slab Mul			Plate						
		Beam Spai	1							
		6.0m								
						C		<mark>-</mark>		
5	lab Span			- <b>,</b>		•	<b>[</b>			
	5.0m	C			<del>-</del>	C	<mark>&gt;C</mark>	<mark></mark>		
				1		•				
					<b></b>	C		<mark>-</mark>		
					-	•				
			╶╴╴╴╴		<b>_</b>			<b>-</b>		
		╘╴╁╴ <sub>┻</sub>			╶┻╴┤	·	╘╴╁╴╻	╘		
					╺┖╌┦┛━━━				+	
	t.	Interior						<u>г</u>	1	
	Relevant Panels	Edge of Sla	ab Span							
	an	Edge of Be							-	
	Å E	Corner								
		Construct				ort C	Conditions	;		
		Continuous	s (Simple o	or Cont Er			Continuous			
		Precast			S	mply	Supported	1		
		Number o					Multi-spar			
		Number o	r beam sp	bans			Multi-spar	1		
Sinale-Sn	an Slab Mi	ulti-Span F	Beam Floo	r Plate						
5 <u>9</u> .6 6p	1	Beam Spai								
		6.0m							-	
		<b></b>				_				
S	lab Span									
red;	5.0m									
	s It	Interior					N/A			
	elevan Panels	Edge of Sla								
	Relevant Panels	Edge of Be	am Span				N/A		<u> </u>	
		Corner								
		<b>6</b>	·		-					
		Construct		r Cont Er			C <b>onditions</b> Continuous			
		Precast					Supported			
						pry		·	+	
		Number o	of slab spa	Ins		S	Single-spar	1		
		Number o					Multi-spar		1	
			•							
						_				
									<u> </u>	
									<u> </u>	
									<u> </u>	
									<u> </u>	
									<u> </u>	
									<u> </u>	

CON	SULTING	Enginoorin	a Calculatio	n Shoot		Job No.	Sheet No.		Rev.
	N E E R S			n Sheet		jXXX		6	
Endi					1	_		5	
						Member/Location			
Job Title			forced Con		Vay Spanni	Drg.			
Member D	esign - RC (	One Way Sp	anning Slal	)		Made by XX	Date <b>21</b>	/11/2021	hd.
Multi-Spa	n Slab Sin			Plate					
		Beam Spai	1						
		6.0m							
5	lab Span								
	5.0m		<b>_</b>						
		· J							
			]						
			3						
		Interior				N/A			
	an	Edge of Sla	ah Snan			N/A			
	Relevant Panels	Edge of Be							
	a d	Corner	am opun						
		Construct	ion Type		Support C	Conditions			
			s (Simple or			Continuous			
		Precast			Simply	Supported			
		Number o	f slab spa	ns		Multi-span			
		Number o	f beam sp	ans	S	Single-span			
Single-Sp	an Slab Si	ngle-Span	Beam Floo	or Plate					
	I	Beam Spai	ו						
		6.0m							
S	lab Span	1							
	5.0m							-	
		Testeview				NI / A			
	ant	Interior				N/A			
	Relevant Panels	Edge of Sla	-			N/A			
	Pa	Edge of Be	am Span			N/A			
	-	Corner							
		Construct	ion Type		Support C	onditions			
			S (Simple or			Continuous			
		Precast				Supported		-	
					Cimply				
		Number o	f slab spa	ns	S	Single-span			
			f beam sp			Single-span			
						5			
Note that :	simple or co	ntinuous ei	nd slab sup	oort conditi	ons refer to	the end su	ipports of n	nulti-span	
	slabs and i								
		-	,						



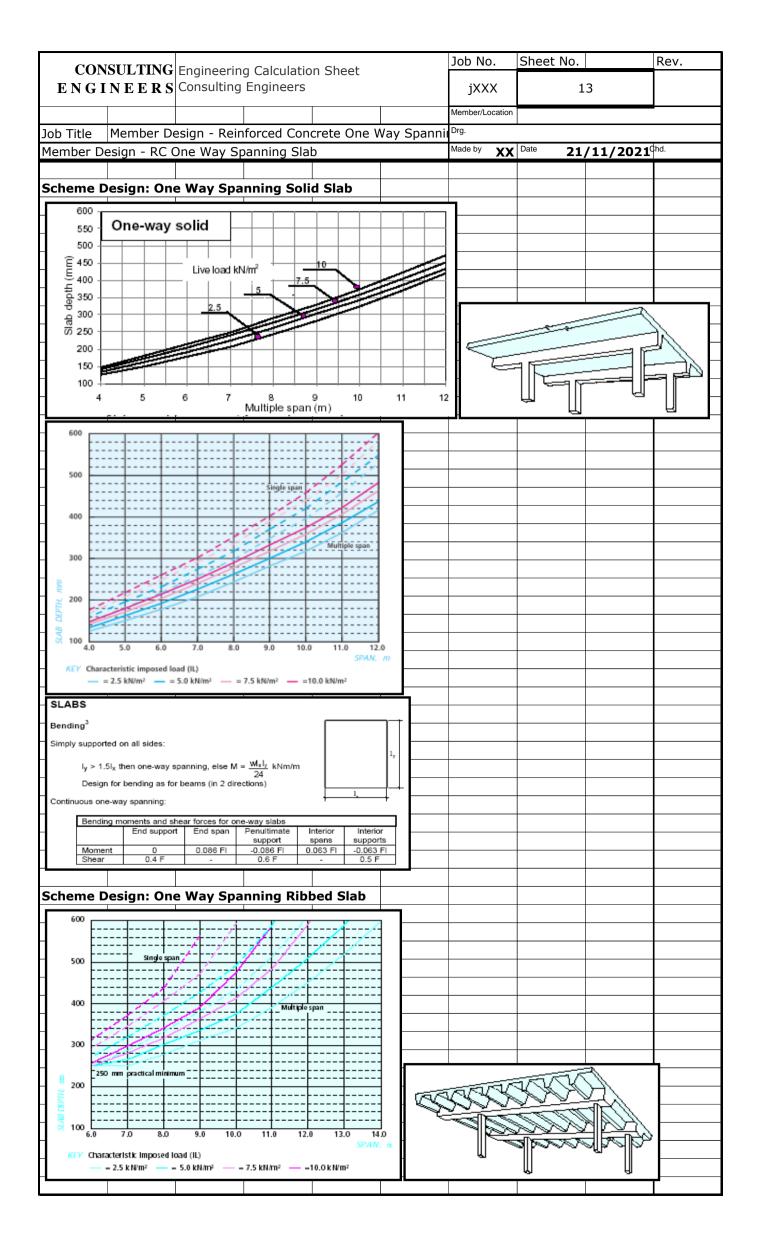
CON	SULTIN	G Engineeri	na Calculatio	n Shoot		Job	No.	Sheet	: No.			Rev.	
		S Consulting		II Sheet		i	xxx		8	3			
LIGI			,,	[	[					5			
		<u> </u>					er/Location						
Job Title		Design - Rei			Vay Spanni	Drg. Made		Data				الم ما	
Member De	esign - R(	C One Way S	panning Sla	0		wade	<sup>by</sup> XX	Date	21	/11/20	<b>21</b> <sup>0</sup>	na.	
<u></u>													
Structura	i Anaiysi	s Slab											
Design ULS	5 total loa	ad for per sp	an, F = n.l						202	kN/m			
- T	able 3.1	2 — Ultima	-			forc				-	sla	ıbs	]
			End support/s		on itinuous		At fi inter			iddle erior		nterior 1pports	16
	ŀ	Sim At outer	pie Near middle		Near mid	ldle	supp			oans	_		
		support	of end span	support	of end s		-0.12			50FI <sup>#PL</sup>		.083FI	
Momer		0	0.086Fl	-0.04Fl	0.075Fl		- 0.080	5Fl	0.063			063 <i>Fl</i>	Ш
Shear		0.4F e total design u	0.080Fl	0.46F	0.080FI		0.6F		_		0.5.	F	
	-	e effective span		r moment e	ffects #PL	Note	allon	iance	has	heen n	nadi	≏ in thi	_
	,		Note elastic		nects.	11010	anow	ance	1145	been n	lau		2
		load case of		sign ultimate	e load on all	span	s or pa	nels wi	ll be s	sufficient	$\square$		
provided	that the fo	llowing condi	ions are met:										
(a) 1.	19.000-000	y spanning sla	h the eres of	each bau arc	peede 20m <sup>2</sup>	In thi	e conta	rt o ber	u mee	ns a stein			
		iy spanning sia ull width of a											
		on in the spans						. sappo	(ac		Ц		
		the character					load do	es not	exceed	d 1.25			
	he charact	eristic impose	d load does n	ot exceed 5k	N/m <sup>2</sup> , exclue	ding j	partition	IS					
		sis the elastic											
	-	a consequentia			nents. The re	sulti	ng bend	ing mo	ment	envelope			
		fy the followi											
		ium must be r stributed mon		tion should	not be leer t		00% 054	he alact	ie mo	mont			
(I	i) The real	surfouted mon	lent at any sec	aon snouid .	not be less u	1011 /	076 01 0	ne elasi		ment.	J		
_		case = 0.12	5F.I (precas	t or single s	span)					kNm/m			
Hog mome									63	kNm/m			
		0625F.I <i>(sing</i>			nple or con	tinud	ous end	1)					
Shear for s	s/s case =	= 0.5F <i>(preca</i>	st or single	span)					101	kN/m			
	Sim	ple End	Continu	ous End		r	terior						
	At oute	r Near	At outer	Near	At first		Idle of	Inte	rior				
	suppor	h middle of	support	middle of	interior		erior	supp					
		end span		end span	support	S	oans						
Moment	0	81	40	81	126		51	84		kNm/m			
Shear	81	N/A	93	N/A	121		N/A	10		kN/m			
		panels, the s											
instead of	the first i	nterior supp	ort because i	the SDL will	I be more c	ritica	al here	due to	o the	external	cla	dding.	
Sag mome										kNm/m			
Hog mome	nt, M <sub>hog</sub>									kNm/m			
Shear, V									93	kN/m			

CON								Job No.	Shee	t No.		Rev.
		G Engineer	-		on Shee	t		jXXX			9	
LUNUL						I		-	ion.			
	Mombor	Docian D	ainforce	d Car	croto O		lav Ename	Member/Locati Drg.	on			
		Design - Re C One Way				ne w	ay spanni	-	X Date	21	/11/202	1 <sup>Chd.</sup>
				. <del>.</del>	-			^			,, _02	_
Structural	Analys	is Beam										
Slab UDL o	n heam									02	kN/m	
		$=$ F. $\omega_{\text{beam}}$ +	-1.4SDL		 +1.4D	   haam					kN/m	_
		beams $F = 2$		-						105	KNYTT	
		able 3.5 —						and shea	ar force	s		<u> </u>
		At outer sup	port N		ddle of	Ati	first interior		ddle of		t interior	
Moment		0	0.0	end s 9Fl	Part	-0.1	support 1Fl	0.07Fl	r spans	-0.08		3FI
Shear		0.45F	0.	.08Fl		0.6F	– 0.125Fl	0.05Fl	#PL	0.551		_1—
	is the effect is the total	desi Note ela	astic mo	ment	effects.	#PL	Note allo	wance ha	s been i	made	in this tal	ble
		e me pattern					for 20% i					
nterior or	End Bear	m ?							End I	Beam		
<i>Vote that t</i>	he coeffi	cients abov						edge pane	el as foll	ows.		
			Sá	-	Hog		Shear					
Interior Be	am			)50 190	0.08		0.550					
End Beam Single Spai	n Ream			)80 125	0.12 0.06		0.600 0.500					-
onigie spai	Dealli		0.1	25	0.00		0.500					-
<i>Vote that t</i>	he beam	s are alway	rs contin	uous	unless	sina	le span) si	nce mond	lithic wi	ith co	lumns,	
out the sla		-			-						,	
	nt beam,	M <sub>sag,beam</sub> =		<sup>0</sup> ULS,bea	<sub>am</sub> . I <sub>b</sub> )I <sub>b</sub>	)					kNm	
log mome	nt beam, nt beam,	M <sub>sag,beam</sub> = , M <sub>hog,beam</sub> =	coeff.(a	<sup>D</sup> ULS,bea	<sub>am</sub> . I <sub>b</sub> )I <sub>b</sub>	)				464	kNm	
log mome	nt beam, nt beam,	M <sub>sag,beam</sub> =	coeff.(a	<sup>D</sup> ULS,bea	<sub>am</sub> . I <sub>b</sub> )I <sub>b</sub>	)					kNm	
Hog mome Shear bear	nt beam, nt beam, n, V <sub>beam</sub> :	M <sub>sag,beam</sub> = , M <sub>hog,beam</sub> = = coeff.(ω <sub>UL</sub>	coeff.(c <sub>_S,beam</sub> . I	<sup>D</sup> ULS,bea	<sub>am</sub> . I <sub>b</sub> )I <sub>b</sub>	)				464	kNm	
Hog mome Shear bear	nt beam, nt beam, n, V <sub>beam</sub> :	M <sub>sag,beam</sub> = , M <sub>hog,beam</sub> =	coeff.(c <sub>_S,beam</sub> . I	<sup>D</sup> ULS,bea	<sub>am</sub> . I <sub>b</sub> )I <sub>b</sub>	)				464	kNm	
log mome Shear bear Structural	nt beam, nt beam, n, V <sub>beam</sub> I <b>Analys</b> i	M <sub>sag,beam</sub> = , M <sub>hog,beam</sub> = = coeff.( <sub>UUL</sub> is Edge Be	COEff.(d _ <sub>S,beam</sub> .   am	<sup>D</sup> ULS,bea <sup>D</sup> ULS,be b)	am . I <sub>b</sub> )I <sub>t</sub> am . I <sub>b</sub> )I <sub>l</sub>	b b				464 371	kNm kN	
log mome Shear bear Structural Slab UDL o	nt beam, nt beam, n, V <sub>beam</sub> I <b>Analys</b> i n edge b	M <sub>sag,beam</sub> = , M <sub>hog,beam</sub> = = coeff.(ω <sub>UL</sub> is <b>Edge Be</b> eam, ω <sub>edge</sub>	coeff.(c _ <sub>S,beam</sub> . I am = assum	<sup>DULS,bea</sup> DULS,be b) ned 1.	am . I <sub>b</sub> )I <sub>t</sub> am . I <sub>b</sub> )I <sub>l</sub>	b ge,DL				<b>464</b> <b>371</b> 5	kNm	
log mome Shear bear Structural Slab UDL o	nt beam, nt beam, n, V <sub>beam</sub> I <b>Analys</b> n edge b	$M_{sag,beam} =$ $M_{hog,beam} =$ $= coeff.(\omega_{UL})$ is Edge Beam, $\omega_{edge}$ $= \omega_{edge} + 1.4$	am = assum = assum	<sup>DULS,bea</sup> <sup>DULS,bea b) ned 1. <sub>edge</sub>+1</sup>	am . I <sub>b</sub> )I <sub>b</sub> am . I <sub>b</sub> )I <sub>l</sub> .am . I <sub>b</sub> )I <sub>l</sub> .4 x ω <sub>ed</sub>	b ge,DL	g moments	and shee	ar force	<b>464</b> <b>371</b> 5 16	kNm kN kN/m	
log mome Shear bear Structural Slab UDL o	nt beam, nt beam, n, V <sub>beam</sub> I <b>Analys</b> n edge b	M <sub>sag,beam</sub> = , M <sub>hog,beam</sub> = = coeff.(ω <sub>UL</sub> is <b>Edge Be</b> eam, ω <sub>edge</sub>	= coeff.(d 	<sup>DULS,beanderenderenderenderenderenderenderende</sup>	am . I <sub>b</sub> )I <sub>b</sub> am . I <sub>b</sub> )I <sub>l</sub> .am . I <sub>b</sub> )I .am . Ib .am . Ib .am . I	) b ge,DL ge	first interior	At mi	ddle of	464 371 5 16 s	kNm kN kN/m kN/m	
Hog mome Shear bear Structural Slab UDL o	nt beam, nt beam, n, V <sub>beam</sub> I <b>Analys</b> n edge b	$M_{sag,beam} =$ $M_{hog,beam} =$ $= coeff.(\omega_{UL})$ is Edge Bean, $\omega_{edge}$ $= \omega_{edge} + 1.4$ Cable 3.5 —	Coeff.(d S,beam .   am am am am am SDLelev, Design port N	<sup>DULS,bea</sup> DULS,be b) ned 1. <sub>edge</sub> +1	am . I <sub>b</sub> )I <sub>b</sub> am . I <sub>b</sub> )I <sub>l</sub> .am . I <sub>b</sub> )I .am . Ib .am . Ib .am . I	) b ge,DL ge	first interior support	At mi		464 371 5 16 \$	kNm kN kN/m kN/m	
Hog mome Shear bear Structural Slab UDL o JLS beam,	nt beam, nt beam, n, V <sub>beam</sub> I <b>Analys</b> i n edge b <sup>©</sup> ULS,edge <b>T</b>	$M_{sag,beam} =$ $M_{hog,beam} =$ $= coeff.(\omega_{UL})$ is Edge Bean, $\omega_{edge}$ $= \omega_{edge} + 1.4$ Cable 3.5 —	Coeff.(costing S,beam - 1 am = assum 4SDL <sub>elev</sub> , Design 0.00	DULS,bea DULS,bea b) ned 1. .edge+1 ultim	am . I <sub>b</sub> )I <sub>b</sub> am . I <sub>b</sub> )I <sub>l</sub> .am . I <sub>b</sub> )I .am . Ib .am . Ib .am . I	ge,DL ge ding	first interior support 1 <i>Fl</i>	At mi interio	ddle of r spans	464 371 5 16 s	kNm kN kN/m kN/m trinterior supports BFT -0.083	3 <i>F1</i>
Glab UDL o JLS beam, Moment Shear NOTE I	nt beam, nt beam, n, V <sub>beam</sub> I <b>Analys</b> I <b>Analys</b>	$M_{sag,beam} =$ $M_{sag,beam} =$ $= coeff.(\omega_{UL})$ is Edge Be eam, $\omega_{edge}$ $= \omega_{edge} + 1.4$ Cable 3.5 — At outer sup 0 0.45F	E COEff. (d S,beam .   am = assum 4SDL <sub>elev</sub> , Design port N 0.0 0.0	<sup>DULS, bea DULS, bea b) ned 1. .edge+1 ultim ear mic end s 9F7 .08F1</sup>	am . l <sub>b</sub> )l <sub>b</sub> am . l <sub>b</sub> )l <sub>l</sub> .am . l <sub>b</sub> )l .4 x ω <sub>edu</sub> 1.4DL <sub>edg</sub> ate ber ddle of	ge,DL ge ding -0.1 0.6F	first interior support 1Fl -0.125Fl	At mic interio 0.07Fl 0.05Fl	ddle of r spans #PL	464 371 5 16 s -0.08 0.555	kNm kN kN/m kN/m supports 8FT -0.083	
And the second s	nt beam, nt beam, n, V <sub>beam</sub> I <b>Analys</b> I <b>Analys</b> n edge b <sup>©</sup> ULS,edge <b>T</b> is the effect is the effect	$M_{sag,beam} =$ $M_{hog,beam} =$ $= coeff.(\omega_{UL})$ is Edge Beam, $\omega_{edge}$ $= \omega_{edge} + 1.4$ $able 3.5 - 4$ At outer sup, $0$ $0.45F$	E COEff. (d S,beam .   am = assum 4SDL <sub>elev</sub> , Design port N 0.00	DULS,bea DULS,bea b) ned 1. edge+1 ultim ear mid end s 9F1 .08F1 ment	am . I <sub>b</sub> )I <sub>t</sub> am . I <sub>b</sub> )I am . I <sub>b</sub> )I .4 x ω <sub>ed</sub> 1.4DL <sub>edg</sub> ate ber ddle of pan effects.	ge,DL ge ding -0.1 0.6F	first interior support 1Fl -0.125Fl Note allo	At ministerio 0.07 <i>F1</i> 0.05 <i>F1</i> wance ha	ddle of r spans #PL s been I	464 371 5 16 s -0.00 0.55J	kNm kN kN/m kN/m trinterior supports SFT - 0.08. F	
Glab UDL o JLS beam, Moment NOTE 1 No redistri	nt beam, nt beam, n, V <sub>beam</sub> I <b>Analys</b> n edge b <sup>(0)</sup> ULS,edge <b>T</b> is the effect 'is the total bution of th	$M_{sag,beam} =$ $M_{sag,beam} =$ $= coeff.(\omega_{UL})$ is Edge Be eam, $\omega_{edge}$ $= \omega_{edge} + 1.4$ is outer sup 0 0.45F	E COEff. (d S,beam .   am am am am assum 4SDL <sub>elev</sub> , Design port N 0.00 0.00 asstic mod	DULS,bea DULS,bea b) ned 1. edge+1 ultim ear mid end s 9F1 .08F1 ment	am . I <sub>b</sub> )I <sub>t</sub> am . I <sub>b</sub> )I am . I <sub>b</sub> )I .4 x ω <sub>ed</sub> 1.4DL <sub>edg</sub> ate ber ddle of pan effects.	ge,DL ge ding -0.1 0.6F	first interior support 1Fl -0.125Fl	At ministerio 0.07 <i>F1</i> 0.05 <i>F1</i> wance ha	ddle of r spans #PL s been i redistribu	464 371 5 16 s 0.55 made ution;	kNm kN kN/m kN/m trinterior supports SFT - 0.08. F	
Hog mome Shear bear Structural Slab UDL o JLS beam, Moment Shear NOTE 1 F No redistri	nt beam, nt beam, n, V <sub>beam</sub> I <b>Analys</b> n edge b <sup>(0)</sup> ULS,edge <b>T</b> is the effect 'is the total bution of th	$M_{sag,beam} =$ $M_{sag,beam} =$ $= coeff.(\omega_{UL})$ is Edge Be eam, $\omega_{edge}$ $= \omega_{edge} + 1.4$ is outer sup 0 0.45F	E COEff. (d S,beam .   am am am am assum 4SDL <sub>elev</sub> , Design port N 0.00 0.00 asstic mod	DULS,bea DULS,bea b) ned 1. edge+1 ultim ear mid end s 9F1 .08F1 ment	am . I <sub>b</sub> )I <sub>t</sub> am . I <sub>b</sub> )I am . I <sub>b</sub> )I .4 x ω <sub>ed</sub> 1.4DL <sub>edg</sub> ate ber ddle of pan effects.	ge,DL ge ding -0.1 0.6F	first interior support 1Fl 7 - 0.125Fl Note allo	At ministerio 0.07 <i>F1</i> 0.05 <i>F1</i> wance ha	ddle of r spans #PL s been i redistribu	464 371 5 16 s -0.00 0.55J	kNm kN kN/m kN/m trinterior supports SFT - 0.08. F	
Alog mome Shear bear Structural Slab UDL o JLS beam, US beam, Noment Shear Nore I No redistri	nt beam, nt beam, n, V <sub>beam</sub> I Analysi n edge b <sup>(0)</sup> ULS,edge T is the effect 'is the total bution of th End Bean	$M_{sag,beam} =$ $M_{sag,beam} =$ $= coeff.(\omega_{UL})$ is Edge Be eam, $\omega_{edge}$ $= \omega_{edge} + 1.4$ is outer sup 0 0.45F	am = assum 4SDL <sub>elev</sub> , Design port N 0.00	DULS,bee DULS,bee b) ned 1. edge+1 ultim ear mic ear mic ear mic ear factor	am . l <sub>b</sub> )l <sub>b</sub> am . l <sub>b</sub> )l .am . l <sub>b</sub> )l .am . l <sub>b</sub> )l .4 X ω <sub>ed</sub> 1.4DL <sub>edg</sub> ate ben ddle of pan	ge,DL ge ding -0.1 0.6F	first interior support 1F( -0.125F/ Note allo for 20% (	At mi interio 0.07Fl 0.05Fl wance ha moment r	#PL	464 371 5 16 s —0.00 0.555 made ution; Beam	kNm kN kN/m kN/m trinterior supports SFT - 0.08. F	
Hog mome Shear bear Structural Slab UDL o JLS beam, US beam, Noment Shear Nore I F No redistri	nt beam, nt beam, n, V <sub>beam</sub> I Analysi n edge b <sup>(0)</sup> ULS,edge T is the effect 'is the total bution of th End Bean	$M_{sag,beam} =$ $M_{sag,beam} =$ $= coeff.(\omega_{UL})$ is Edge Beam, $\omega_{edge}$ $= \omega_{edge} + 1.4$ is ble 3.5 — At outer sup, 0 0.45F ive space desi Note ela pattern m ?	am = assum 4SDL <sub>elev</sub> , Design port N 0.00	<sup>DULS, bea <sup>DULS, bea b) ned 1. redge + 1 ultim ear mic end s 9F7 08F/ ment factor ppropr</sup></sup>	am . l <sub>b</sub> )l <sub>b</sub> am . l <sub>b</sub> )l .am . l <sub>b</sub> )l .am . l <sub>b</sub> )l .4 X ω <sub>ed</sub> 1.4DL <sub>edg</sub> ate ben ddle of pan	ge,DL ge ding -0.1 0.6F #PL	first interior support 1F( -0.125F/ Note allo for 20% (	At mi interio 0.07Fl 0.05Fl wance ha moment r	#PL	464 371 5 16 s —0.00 0.555 made ution; Beam	kNm kN kN/m kN/m trinterior supports SFT - 0.08. F	
Hog mome Shear bear Structural Slab UDL o JLS beam, Moment Shear NoTE t F No redistri	nt beam, nt beam, n, V <sub>beam</sub> I Analysi I Analysi I analysi n edge b <sup>(0)</sup> ULS,edge T is the effect is the effect is the effect is the effect bution of th End Beau	$M_{sag,beam} =$ $M_{sag,beam} =$ $= coeff.(\omega_{UL})$ is Edge Beam, $\omega_{edge}$ $= \omega_{edge} + 1.4$ is able 3.5	E coeff.(control of the second	<sup>DULS, bea <sup>DULS, bea b) ned 1. redge + 1 ultim ear mic end s 9F7 08F/ ment factor ppropr</sup></sup>	am . I <sub>b</sub> )I <sub>t</sub> am . I <sub>b</sub> )I am . I <sub>b</sub> )I	ge,DL ge ding -0.1 0.6F #PL	first interior support 1Fl -0.125Fl Note allo for 20% l	At mi interio 0.07Fl 0.05Fl wance ha moment r	#PL	464 371 5 16 s —0.00 0.555 made ution; Beam	kNm kN kN/m kN/m trinterior supports SFT - 0.08. F	
Hog mome Shear bear Structural Slab UDL o JLS beam, ULS beam, Note that t Note that t	nt beam, nt beam, n, V <sub>beam</sub> I Analysi I Analysi I an edge b OULS,edge T I I an edge b OULS,edge T I I an edge b I	$M_{sag,beam} =$ $M_{sag,beam} =$ $= coeff.(\omega_{UL})$ is Edge Beam, $\omega_{edge}$ $= \omega_{edge} + 1.4$ is able 3.5	E coeff.(co S,beam . I am am am am assum 4SDL <sub>elev</sub> , Design 0.00 0.0	DULS,bea DULS,bea b) ned 1. edge + 1 ultim ear mid ear	am . l <sub>b</sub> )l <sub>t</sub> am . l <sub>b</sub> )l am . l <sub>b</sub> )l 4 x ω <sub>edg</sub> 4 x ω <sub>edg</sub> 1.4DL <sub>edg</sub> ate ber ddle of pan effects. r 1.2;	ge,DL ge ding -0.1 0.6F #PL	first interior support 1F( 0.125F/ Note allo for 20% i nterior or e Shear	At mi interio 0.07Fl 0.05Fl wance ha moment r	#PL	464 371 5 16 s —0.00 0.555 made ution; Beam	kNm kN kN/m kN/m trinterior supports SFT - 0.08. F	
Hog mome Shear bear Structural Slab UDL o JLS beam, Moment Shear NOTE 1 F No redistri	nt beam, nt beam, n, V <sub>beam</sub> I <b>Analys</b> I <b>A</b>	$M_{sag,beam} =$ $M_{sag,beam} =$ $Coeff.(\omega_{UL})$ $S Edge Beam, \omega_{edge}$ $= \omega_{edge} + 1.4$ $S able 3.5 - 10$ $At outer sup$ $0$ $0.45F$ $Note elapattern$ $m ?$ $Cients above$	E coeff.(co S,beam . I am am am am assum 4SDL <sub>elev</sub> , Design 0.00 0.0	DULS,bea DULS,bea b) ned 1. edge+1 ultim eard s 9F7 .08F1 ment factor factor	am · l <sub>b</sub> )l <sub>t</sub> am · l <sub>b</sub> )l am · l <sub>b</sub> )l .am · l <sub>b</sub> )l .ate ben ddle of pan effects. r 1.2; iate to Hog 0.08	ge,DL ge ding -0.1 0.6 <i>#PL</i> <i>#PL</i>	first interior support 1F( -0.125F( Note allo for 20% ( nterior or e Shear 0.550	At mi interio 0.07Fl 0.05Fl wance ha moment r	#PL	464 371 5 16 s —0.00 0.555 made ution; Beam	kNm kN kN/m kN/m trinterior supports SFT - 0.08. F	
Hog mome Shear bear Structural Slab UDL o JLS beam, ULS beam, Noment Shear Note that t Noredistri	nt beam, nt beam, n, V <sub>beam</sub> I Analysi I Analysi I an edge b OULS,edge T T I I I I I I I I I I I I I I I I I I	$M_{sag,beam} =$ $M_{sag,beam} =$ $= coeff.(\omega_{UL})$ is Edge Beam, $\omega_{edge}$ $= \omega_{edge} + 1.4$ is ble 3.5	E coeff.(control of the second	DULS,bea DULS,bea b) ned 1. edge+1 ultim eard s 9F7 .08F1 ment factor ppropr ag 050 080 225	am · l <sub>b</sub> )l <sub>b</sub> am · l <sub>b</sub> )l am · l <sub>b</sub> )l 4 × ω <sub>ed</sub> 1.4DL <sub>ed</sub> ate ber ddle of pan effects. r 1.2; iate to Hog 0.08 0.12 0.06	ge,DL ge ding -0.1 0.6F #PL the in i 3 5 3	nterior or e Shear 0.550 0.500	At mi interio 0.07 <i>Fl</i> 0.05 <i>Fl</i> wance ha moment r	#PL	464 371 5 16 s -0.00 0.55J made ution; 3eam	kNm kN kN/m kN/m trinterior supports BFT - 0.08. F in this tal	
log mome Shear bear Structural Slab UDL o JLS beam, Moment Shear NOTE <i>I</i> No redistri	nt beam, nt beam, n, V <sub>beam</sub> I <b>Analys</b> I <b>Analys</b> n edge b OULS,edge T is the effect is the effect is the effect is the coeffi ge Beam he coeffi Beam n Edge B	$M_{sag,beam} =$ $M_{sag,beam} =$ $Coeff.(\omega_{UL})$ $Solution is Edge Beam, \omega_{edge} = \omega_{edge} + 1.4 Solution is above the elast of the elast $	E coeff.(co S,beam . 1 am am am am assum 4SDL <sub>elev</sub> , Design port N 0.00 0.0 0.0 0.0 0.0 0.0 0.0 0	DULS,bee DULS,bee b) ned 1. edge+1 ultim eadge+1 ultim factor propr ag 050 080 225 uous	am . l <sub>b</sub> )l <sub>t</sub> am . l <sub>b</sub> )l am . l <sub>b</sub> )l 4 x wed 1.4DLedg ate ben ddle of pan effects. r 1.2; iate to Hog 0.08 0.12 0.06 (unless	ge,DL ge ding -0.1 0.6 #PL #PL the in 7 3 5 3 sing	Interior or e Shear 0.550 0.600 0.500	At mi interio 0.07 <i>Fl</i> 0.05 <i>Fl</i> wance ha moment r	#PL	464 371 5 16 s -0.00 0.55J made ution; 3eam	kNm kN kN/m kN/m trinterior supports BFT - 0.08. F in this tal	
Hog mome Shear bear Structural Slab UDL o JLS beam, Moment Shear NOTE 1 F No redistri	nt beam, nt beam, n, V <sub>beam</sub> I <b>Analys</b> I <b>Analys</b> n edge b OULS,edge T is the effect is the effect is the effect is the coeffi ge Beam he coeffi Beam n Edge B	$M_{sag,beam} =$ $M_{sag,beam} =$ $= coeff.(\omega_{UL})$ is Edge Beam, $\omega_{edge}$ $= \omega_{edge} + 1.4$ is ble 3.5	E coeff.(co S,beam . 1 am am am am assum 4SDL <sub>elev</sub> , Design port N 0.00 0.0 0.0 0.0 0.0 0.0 0.0 0	DULS,bee DULS,bee b) ned 1. edge+1 ultim eadge+1 ultim factor propr ag 050 080 225 uous	am . l <sub>b</sub> )l <sub>t</sub> am . l <sub>b</sub> )l am . l <sub>b</sub> )l 4 x wed 1.4DLedg ate ben ddle of pan effects. r 1.2; iate to Hog 0.08 0.12 0.06 (unless	ge,DL ge ding -0.1 0.6 #PL #PL the in 7 3 5 3 sing	Interior or e Shear 0.550 0.600 0.500	At mi interio 0.07 <i>Fl</i> 0.05 <i>Fl</i> wance ha moment r	#PL	464 371 5 16 s -0.00 0.55J made ution; 3eam	kNm kN kN/m kN/m trinterior supports BFT - 0.08. F in this tal	
Hog mome Shear bear Structural Slab UDL o JLS beam, Moment Shear Note that t Note that t Single Spai Single Spai	nt beam, nt beam, n, V <sub>beam</sub> I Analysi I Analysi I Analysi I the effect I sthe effect I sthe officient I sthe officient I sthe coefficient I sthe coefficient I state of the I state of the I state of the I state of the I state of the I state of the I state of the I state of the I state of th	M <sub>sag,beam</sub> = M <sub>sag,beam</sub> = coeff.(ω <sub>UL</sub> is Edge Bea eam, ω <sub>edge</sub> = ω <sub>edge</sub> +1.4 rable 3.5	E coeff. (d S,beam . 1 am am am am assum 4SDL <sub>elev</sub> , Design 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	DULS,beacher DUS,beacher DUS,be	am · l <sub>b</sub> )l <sub>t</sub> am · l <sub>b</sub> )l am · l <sub>b</sub> )l am · l <sub>b</sub> )l at the second	ge,DL ge ding -0.1 0.6F #PL #PL 3 5 3 5 3 5 3 5 3 0r p	Interior or e Shear 0.550 0.600 0.500	At mi interio 0.07 <i>Fl</i> 0.05 <i>Fl</i> wance ha moment r	#PL	464 371 5 16 s -0.08 0.555 made ution; Beam fows.	kNm kN kN/m kN/m kN/m supports BFT -0.08: F in this tal	
Hog mome Shear bear Structural Slab UDL o JLS beam, Note bear Note that t Single Spar Note that t but the slav	nt beam, nt beam, n, V <sub>beam</sub> I Analysi I Analysi I Analysi I constant I const	M <sub>sag,beam</sub> = , M <sub>hog,beam</sub> = = coeff.(ω <sub>UL</sub> is Edge Beat eam, ω <sub>edge</sub> = ω <sub>edge</sub> +1.4 iable 3.5 At outer sup, 0 0.45F ve souther sup, 0 0.45F ve souther sup, 0 0.45F s are alway continuous beam, M <sub>sag,e</sub>	E coeff. (constructions)	DULS,bee DULS,bee b) ned 1. edge + 1 ultim factor 087/ 087/ 087/ 087/ 087/ 087/ 087/ 087/	am · lb)lt am · lb)lt am · lb)lt am · lb)lt at the second at the second	ge,DL ge ding ading ding ding ding sing or p . l)l	Interior or e Shear 0.550 0.600 0.500	At mi interio 0.07 <i>Fl</i> 0.05 <i>Fl</i> wance ha moment r	#PL	464 371 5 16 s 0.551 made ution; 3eam cows.	kNm kN/m kN/m kN/m supports BFT - 0.08 F in this tal	
Hog mome Shear bear Structural Slab UDL o JLS beam, Moment Shear NOTE <i>i</i> NOTE <i>i</i> NOTE <i>i</i> NOTE <i>i</i> NOTE <i>i</i> Shear NOTE Shear Shear Shear Shear Shear Shear NOTE Shear	nt beam, nt beam, n, V <sub>beam</sub> I <b>Analys</b> I <b>Analys</b> n edge b $\omega_{ULS,edge}$ <b>T</b> is the effect is the effect is the total bution of th End Bear <i>he coeffi</i> <i>ge Bearm</i> <i>he coeffi</i> <i>ge Bearm</i> <i>he coeffi</i> <i>ge Bearm</i> <i>he bearm</i> <i>b can be</i> nt edge I nt edge I	M <sub>sag,beam</sub> = , M <sub>hog,beam</sub> = = coeff.(ω <sub>UL</sub> is Edge Bea eam, ω <sub>edge</sub> = ω <sub>edge</sub> +1.4 iable 3.5 At outer sup 0 0.45F ive sort dest Note ela pattern m ? cients abov eam s are alway continuous Deam, M <sub>sag,6</sub> Deam, M <sub>sag,6</sub>	E COEff. (C S,beam .   am am am am am assum 4SDL <sub>elev</sub> , Design port N 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	DULS,bee DULS,bee b) ned 1. .edge+1 ultim ear mice eard s 9F7 08F1 08F1 08F1 08F1 08F1 050 080 225 050 080 225 050 080 225 050 080 255 0000000000	am · lb)lt am · lb)lt am · lb)lt am · lb)lt at ber ddle of pan effects. r 1.2; iate to Hog 0.08 0.12 0.06 (unless e span) DULS,edge	ge,DL ge ding ading ding ding ding sing or p . l)l	Interior or e Shear 0.550 0.600 0.500	At mi interio 0.07 <i>Fl</i> 0.05 <i>Fl</i> wance ha moment r	#PL	464 371 5 16 s -0.08 0.55 0.55 0.55 made ution; 3eam cows.	kNm kN/m kN/m kN/m supports BF7 -0.08. F in this tal	
Hog mome Shear bear Structural Slab UDL o JLS beam, Moment Shear NOTE <i>i</i> NOTE <i>i</i> NOTE <i>i</i> NOTE <i>i</i> NOTE <i>i</i> Shear NOTE Shear Shear Shear Shear Shear Shear NOTE Shear	nt beam, nt beam, n, V <sub>beam</sub> I <b>Analys</b> I <b>Analys</b> n edge b $\omega_{ULS,edge}$ <b>T</b> is the effect is the effect is the total bution of th End Bear <i>he coeffi</i> <i>ge Bearm</i> <i>he coeffi</i> <i>ge Bearm</i> <i>he coeffi</i> <i>ge Bearm</i> <i>he bearm</i> <i>b can be</i> nt edge I nt edge I	M <sub>sag,beam</sub> = , M <sub>hog,beam</sub> = = coeff.(ω <sub>UL</sub> is Edge Beat eam, ω <sub>edge</sub> = ω <sub>edge</sub> +1.4 iable 3.5 At outer sup, 0 0.45F ve souther sup, 0 0.45F ve souther sup, 0 0.45F s are alway continuous beam, M <sub>sag,e</sub>	E COEff. (C S,beam .   am am am am am assum 4SDL <sub>elev</sub> , Design port N 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	DULS,bee DULS,bee b) ned 1. .edge+1 ultim ear mice eard s 9F7 08F1 08F1 08F1 08F1 08F1 050 080 225 050 080 225 050 080 225 050 080 255 0000000000	am · lb)lt am · lb)lt am · lb)lt am · lb)lt at ber ddle of pan effects. r 1.2; iate to Hog 0.08 0.12 0.06 (unless e span) DULS,edge	ge,DL ge ding ading ding ding ding sing or p . l)l	Interior or e Shear 0.550 0.600 0.500	At mi interio 0.07 <i>Fl</i> 0.05 <i>Fl</i> wance ha moment r	#PL	464 371 5 16 s -0.08 0.55 0.55 0.55 made ution; 3eam cows.	kNm kN/m kN/m kN/m supports <i>BFT</i> -0.08 <i>F</i> in this tal	
Hog mome Shear bear Structural Slab UDL o JLS beam, Moment Shear NOTE <i>i</i> NOTE <i>i</i> NOTE <i>i</i> NOTE <i>i</i> NOTE <i>i</i> Shear NOTE Shear Shear Shear Shear Shear Shear NOTE Shear	nt beam, nt beam, n, V <sub>beam</sub> I <b>Analys</b> I <b>Analys</b> n edge b $\omega_{ULS,edge}$ <b>T</b> is the effect is the effect is the total bution of th End Bear <i>he coeffi</i> <i>ge Bearm</i> <i>he coeffi</i> <i>ge Bearm</i> <i>he coeffi</i> <i>ge Bearm</i> <i>he bearm</i> <i>b can be</i> nt edge I nt edge I	M <sub>sag,beam</sub> = , M <sub>hog,beam</sub> = = coeff.(ω <sub>UL</sub> is Edge Bea eam, ω <sub>edge</sub> = ω <sub>edge</sub> +1.4 iable 3.5 At outer sup 0 0.45F ive sort dest Note ela pattern m ? cients abov eam s are alway continuous Deam, M <sub>sag,6</sub> Deam, M <sub>sag,6</sub>	E COEff. (C S,beam .   am am am am am assum 4SDL <sub>elev</sub> , Design port N 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	DULS,bee DULS,bee b) ned 1. .edge+1 ultim ear mice eard s 9F7 08F1 08F1 08F1 08F1 08F1 050 080 225 050 080 225 050 080 225 050 080 255 0000000000	am · lb)lt am · lb)lt am · lb)lt am · lb)lt at ber ddle of pan effects. r 1.2; iate to Hog 0.08 0.12 0.06 (unless e span) DULS,edge	ge,DL ge ding ading ding ding ding sing or p . l)l	Interior or e Shear 0.550 0.600 0.500	At mi interio 0.07 <i>Fl</i> 0.05 <i>Fl</i> wance ha moment r	#PL	464 371 5 16 s -0.08 0.55 0.55 0.55 made ution; 3eam cows.	kNm kN/m kN/m kN/m supports BF7 -0.08. F in this tal	
Hog mome Shear bear Structural Slab UDL o JLS beam, Moment Shear NOTE <i>i</i> NOTE <i>i</i> NOTE <i>i</i> NOTE <i>i</i> NOTE <i>i</i> Shear NOTE Shear Shear Shear Shear Shear Shear NOTE Shear	nt beam, nt beam, n, V <sub>beam</sub> I <b>Analys</b> I <b>Analys</b> n edge b $\omega_{ULS,edge}$ <b>T</b> is the effect is the effect is the total bution of th End Bear <i>he coeffi</i> <i>ge Bearm</i> <i>he coeffi</i> <i>ge Bearm</i> <i>he coeffi</i> <i>ge Bearm</i> <i>he bearm</i> <i>b can be</i> nt edge I nt edge I	$M_{sag,beam} =$ $M_{sag,beam} =$ $Coeff.(\omega_{UL} B = Coeff.(\omega_{UL} B = Coeff.( \omega_{UL} B = Coeff.( \omega_{UL} B = Coeff.( \omega_{UL} Coeff$	E COEff. (C S,beam .   am am am am am assum 4SDL <sub>elev</sub> , Design port N 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	DULS,bee DULS,bee b) ned 1. .edge+1 ultim ear mice eard s 9F7 08F1 08F1 08F1 08F1 08F1 050 080 225 050 080 225 050 080 225 050 080 255 0000000000	am · lb)lt am · lb)lt am · lb)lt am · lb)lt at ber ddle of pan effects. r 1.2; iate to Hog 0.08 0.12 0.06 (unless e span) DULS,edge	ge,DL ge ding ading ding ding ding sing or p . l)l	Interior or e Shear 0.550 0.600 0.500	At mi interio 0.07 <i>Fl</i> 0.05 <i>Fl</i> wance ha moment r	#PL	464 371 5 16 s -0.08 0.55 0.55 0.55 made ution; 3eam cows.	kNm kN/m kN/m kN/m supports BF7 -0.08. F in this tal	

						Job No.	Sheet No.		Rev.
	SULTING NEERS	-	g Calculatio	on Sheet					
ENGI	NEEKS	Consulting	Ligineers			jXXX		LO	
						Member/Location			
lob Title	Member De	esign - Rein	forced Con	crete One V	Vay Spanni	Drg.			
Member De	esign - RC (	One Way Sp	anning Slal	b		Made by XX	Date <b>21</b>	/11/2021	hd.
Slab Mom	ent Desigr	<b>1</b>							
		-							
Sag mome	÷							kNm/m	
log mome	ent, M <sub>hog</sub>							kNm/m	
Ensure sing	gly reinforce	ed $K = M$	$f/bd^2 f_{cu} =$	$= d \left\{ 0.5 + \sqrt{\right.} \right\}$	$\left(0.25 - \frac{K}{0.9}\right)$	)} z <=0.	95d <sup>A</sup> s = (	$\frac{M}{(0.95f_y)z}$	
		<i>K</i> ' =	0.156 K	$= 0.402(\beta_b$	- 0.4) - 0.1	$8(\beta_{b} - 0.4)^{2}$	2		
		Κ'	K	Z	A <sub>s</sub>	A <sub>s,prov</sub>	UT		
Sag mome	nt, M <sub>sag</sub>	0.156	0.055	191	970	1131	86%		ОК
log mome	nt, M <sub>hoa</sub>	0.156	0.088	180	1608	2011	80%		ок
Vote unles	s precast, s	ingle span	or continuo	us elastic w	hereby $\beta_b$	= 1.00 an	d K' = 0.15	6, K' calcula	ated
			) (hogging),						
			that A <sub>s</sub> an						
% Min sag	reinforcem	ent (>= 0.0	0024bh G25	50; >= 0.00	013bh G460	))	0.45	%	
% Min sag	reinforcem	ent utilisati	on				29%		ОК
% Min hog	reinforcem	ent (>= 0.	0024bh G2	50; >= 0.0	013bh G46	0)	0.80	%	
	reinforcem	-					16%		ОК
Slab Shea	r Design								
Jltimate sł	near stress,	v <sub>ult</sub> =V/bd <sub>h</sub>	(< 0.8f <sub>cu</sub> <sup>0.5</sup>	& 5N/mm <sup>2</sup>	)		0.46	N/mm <sup>2</sup>	
	near stress, near stress		(< 0.8f <sub>cu</sub> <sup>0.5</sup>	& 5N/mm <sup>2</sup>	)		0.46 10%	-	ОК
Ultimate sł	near stress	utilisation	(< 0.8f <sub>cu</sub> <sup>0.5</sup>	& 5N/mm <sup>2</sup>	)		10%		ОК
Jltimate sh Design she	near stress ar stress, v	utilisation v <sub>d</sub> =V/bd <sub>h</sub>				na v <sub>a</sub> at d t	10% 0.46	N/mm <sup>2</sup>	ОК
Jltimate sh Design she <i>(Conservat</i>	near stress ar stress, v tively, sheat	utilisation r <sub>d</sub> =V/bd <sub>h</sub> r capacity e	nhancemer	nt by <b>eithe</b>	<b>r</b> calculatir		10% 0.46 From suppor	N/mm <sup>2</sup>	OK
Ultimate sh Design she (Conservat comparing	near stress ear stress, v tively, shear against une	utilisation d=V/bd <sub>h</sub> r capacity e enhanced v	enhancemer r <sub>c</sub> as clause	nt by <b>eithe</b> 3.4.5.10 B	<b>r</b> calculatir S8110 <b>or</b>	calculating	<b>10%</b> <b>0.46</b> From suppor v <sub>d</sub> at supp	N/mm <sup>2</sup> t and ort and	ОК
Ultimate sh Design she (Conservat comparing comparing	near stress ar stress, v tively, sheau against und against eni	utilisation d=V/bd <sub>h</sub> r capacity e enhanced v hanced v c	enhancemer r <sub>c</sub> as clause within 2d of	nt by <b>eithe</b> 3.4.5.10 B f the support	<b>r</b> calculatir S8110 <b>or</b>	calculating	10% 0.46 from suppor v <sub>d</sub> at supp 8110 ignor	N/mm <sup>2</sup> rt and ort and red;)	<u>ОК</u>
Ultimate sh Design she <i>(Conservat</i> <i>comparing</i> Comparing Area of ten	near stress ear stress, v tively, shear against und against eni nsile steel re	utilisation d=V/bd <sub>h</sub> r capacity e enhanced v hanced v c	enhancemer r <sub>c</sub> as clause	nt by <b>eithe</b> 3.4.5.10 B f the support	<b>r</b> calculatir S8110 <b>or</b>	calculating	<b>10%</b> <b>0.46</b> rom suppor v <sub>d</sub> at supp 8110 ignor 2011	N/mm <sup>2</sup> t and ort and ed;) mm <sup>2</sup> /m	OK
Ultimate sh Design she <i>Conservat</i> <i>comparing</i> <i>comparing</i> Area of ten $p_w = 100A_s$	near stress ear stress, v tively, shear against und against eni nsile steel re	utilisation r_d=V/bd <sub>h</sub> r capacity e enhanced v hanced v <sub>c</sub> n einforcemer	enhancemer <sub>c</sub> as clause within 2d of nt provided,	nt by <b>eithe</b> 3.4.5.10 B f the support , A <sub>s,prov,h</sub>	<b>r</b> calculatir S8110 <b>or</b> rt as clause	calculating 3.4.5.8 BS	<b>10%</b> <b>0.46</b> From suppor v <sub>d</sub> at supp 58110 ignor 2011 1.00	N/mm <sup>2</sup> t and ort and red;) mm <sup>2</sup> /m %	<u>ок</u>
Ultimate sh Design she <i>Conservat</i> <i>comparing</i> <i>comparing</i> Area of ten $p_w = 100A_s$	near stress ear stress, v tively, shear against und against eni nsile steel re	utilisation r_d=V/bd <sub>h</sub> r capacity e enhanced v hanced v <sub>c</sub> n einforcemer	enhancemer r <sub>c</sub> as clause within 2d of	nt by <b>eithe</b> 3.4.5.10 B f the support , A <sub>s,prov,h</sub>	<b>r</b> calculatir S8110 <b>or</b> rt as clause	calculating 3.4.5.8 BS	<b>10%</b> <b>0.46</b> From suppor v <sub>d</sub> at supp 58110 ignor 2011 1.00	N/mm <sup>2</sup> t and ort and ed;) mm <sup>2</sup> /m	OK
Ultimate sh Design she <i>Conservat</i> <i>comparing</i> Area of ten $p_w = 100A_s$ $t_c = (0.79)$	near stress ear stress, v <i>tively, shear</i> <i>against und</i> <i>against eni</i> nsile steel re <sub>s,prov,h</sub> /bd <sub>h</sub> /1.25)(ρ <sub>w</sub> f <sub>cu</sub>	utilisation $r_d = V/bd_h$ r capacity e enhanced v hanced v <sub>c</sub> t einforcemer /25) <sup>1/3</sup> (400	enhancemer <sub>c</sub> as clause within 2d of nt provided,	nt by <b>eithe</b> 3.4.5.10 B f the support , A <sub>s,prov,h</sub>	<b>r</b> calculatir S8110 <b>or</b> rt as clause	calculating 3.4.5.8 BS	10% 0.46 from suppor v <sub>d</sub> at supp 8110 ignor 2011 1.00 0.84	N/mm <sup>2</sup> t and ort and red;) mm <sup>2</sup> /m % N/mm <sup>2</sup>	OK
Ultimate sh Design she <i>Conservat</i> <i>comparing</i> Area of ten $p_w = 100A_s$ $v_c = (0.79)$	near stress ear stress, v <i>tively, shear</i> <i>against und</i> <i>against eni</i> nsile steel re s,prov,h/bdh /1.25)(ρ <sub>w</sub> f <sub>cu</sub> < <b>v</b> <sub>c</sub> for no	utilisation d=V/bd <sub>h</sub> r capacity e enhanced v hanced v <sub>c</sub> n einforcemer /25) <sup>1/3</sup> (400 links	$c_{c}$ as clause within 2d of nt provided, $/d_{h})^{1/4}$ ; $\rho_{w} < 0$	nt by <b>eithe</b> 3.4.5.10 B f the support , A <sub>s,prov,h</sub>	<b>r</b> calculatir S8110 <b>or</b> rt as clause	calculating 3.4.5.8 BS	10% 0.46 from suppor v <sub>d</sub> at supp 8110 ignor 2011 1.00 0.84 VALID	N/mm <sup>2</sup> <i>st and</i> <i>ort and</i> <i>ed;)</i> mm <sup>2</sup> /m % N/mm <sup>2</sup>	OK
Ultimate sh Design she <i>Conservat</i> <i>comparing</i> Area of ten $p_w = 100A_s$ $v_c = (0.79)$	near stress ear stress, v <i>tively, shear</i> <i>against und</i> <i>against eni</i> nsile steel re s,prov,h/bdh /1.25)(ρ <sub>w</sub> f <sub>cu</sub> < <b>v</b> <sub>c</sub> for no	utilisation $r_d = V/bd_h$ r capacity e enhanced v hanced v <sub>c</sub> t einforcemer /25) <sup>1/3</sup> (400	$c_{c}$ as clause within 2d of nt provided, $/d_{h})^{1/4}$ ; $\rho_{w} < 0$	nt by <b>eithe</b> 3.4.5.10 B f the support , A <sub>s,prov,h</sub>	<b>r</b> calculatir S8110 <b>or</b> rt as clause	calculating 3.4.5.8 BS	10% 0.46 from suppor v <sub>d</sub> at supp 8110 ignor 2011 1.00 0.84 VALID	N/mm <sup>2</sup> t and ort and red;) mm <sup>2</sup> /m % N/mm <sup>2</sup>	OK
Ultimate sh Design she <i>Conservat</i> <i>comparing</i> Area of ten $p_w = 100A_s$ $t_c = (0.79)$ <b>Check v<sub>d</sub></b>	near stress ear stress, v <i>tively, shear</i> <i>against und</i> <i>against enl</i> nsile steel re s,prov,h/bdh /1.25)(ρwf <sub>cu</sub> < v <sub>c</sub> for no Concrete s	utilisation $v_d = V/bd_h$ r capacity e enhanced v hanced v <sub>c</sub> to hanced v <sub>c</sub> (25) <sup>1/3</sup> (400) links hear capaci	$(c_{c} as clause)$ within 2d of ht provided, $(d_{h})^{1/4}; \rho_{w} < (d_{h})^{1/4}$	nt by <b>eithe</b> 3.4.5.10 B f the support A <sub>s,prov,h</sub> 3; f <sub>cu</sub> <40;	<b>r</b> calculatir S8110 <b>or</b> rt as clause	calculating 3.4.5.8 BS	10% 0.46 from suppor v <sub>d</sub> at supp 8110 ignor 2011 1.00 0.84 VALID 169	N/mm <sup>2</sup> t and ort and red;) mm <sup>2</sup> /m % N/mm <sup>2</sup> kN/m	OK
Ultimate sh Design she <i>Conservat</i> <i>comparing</i> Area of ten $p_w = 100A_s$ $t_c = (0.79)$ <b>Check v<sub>d</sub></b>	hear stress ear stress, v <i>ively, shear</i> <i>against und</i> <i>against eni</i> hsile steel re $s_{prov,h}/bd_h$ (1.25)( $\rho_w f_{cu}$ <b>&lt; v<sub>c</sub> for no</b> Concrete s	utilisation d=V/bd <sub>h</sub> r capacity e enhanced v hanced v <sub>c</sub> to conforcemer /25) <sup>1/3</sup> (400 links hear capaci + v <sub>c</sub> for no	$c_{c}$ as clause within 2d of nt provided, $(d_{h})^{1/4}; \rho_{w} < d_{h}$ ity v <sub>c</sub> .(bd <sub>h</sub> )	nt by <b>eithe</b> 3.4.5.10 B f the support A <sub>s,prov,h</sub> 3; f <sub>cu</sub> <40;	<i>r</i> calculatir 258110 <b>or</b> rt as clause (400/d <sub>h</sub> ) <sup>1/4</sup>	calculating 3.4.5.8 BS >0.67	10% 0.46 From suppor v d at supp 8110 ignor 2011 1.00 0.84 VALID 169	N/mm <sup>2</sup> <i>it and</i> <i>ort and</i> <i>ed;)</i> mm <sup>2</sup> /m % N/mm <sup>2</sup> kN/m	
Ultimate sh Design she <i>Conservat</i> <i>comparing</i> Area of ten $p_w = 100A_s$ $t_c = (0.79)$ <b>Check v<sub>d</sub></b>	hear stress ear stress, v against und against und against eni hsile steel re $_{s,prov,h}/bd_h$ (1.25)( $\rho_w f_{cu}$ < v <sub>c</sub> for no Concrete s < v <sub>d</sub> < 0.4 Provide no	utilisation v <sub>d</sub> =V/bd <sub>h</sub> r capacity e enhanced v hanced v c thanced v c hanced v c	$c_{c}$ as clause within 2d of nt provided, $/d_{h})^{1/4}$ ; $\rho_{w} <$ ty $v_{c}$ . $(bd_{h})$ by by by by by by by by by by by by by	t by <b>eithe</b> 3.4.5.10 B f the support A <sub>s,prov,h</sub> 3; f <sub>cu</sub> <40;	r calculatir S8110 or t as clause (400/d <sub>h</sub> ) <sup>1/4</sup>	calculating 3.4.5.8 BS >0.67 i.e. A <sub>sv</sub> / S	10% 0.46 70m suppor 8110 ignor 2011 1.00 0.84 VALID 169 N/A 0.92	N/mm <sup>2</sup> t and ort and ed;) mm <sup>2</sup> /m % N/mm <sup>2</sup> kN/m kN/m	
Ultimate sh Design she <i>Conservat</i> <i>comparing</i> Area of ten $p_w = 100A_s$ $V_c = (0.79)$ <b>Check v</b> <sub>d</sub>	hear stress ear stress, v against und against und against eni hsile steel re $_{s,prov,h}/bd_h$ (1.25)( $\rho_w f_{cu}$ < v <sub>c</sub> for no Concrete s < v <sub>d</sub> < 0.4 Provide no	utilisation v <sub>d</sub> =V/bd <sub>h</sub> r capacity e enhanced v hanced v c thanced v c hanced v c	$c_{c}$ as clause within 2d of nt provided, $(d_{h})^{1/4}; \rho_{w} < d_{h}$ ity v <sub>c</sub> .(bd <sub>h</sub> )	t by <b>eithe</b> 3.4.5.10 B f the support A <sub>s,prov,h</sub> 3; f <sub>cu</sub> <40;	r calculatir S8110 or t as clause (400/d <sub>h</sub> ) <sup>1/4</sup>	calculating 3.4.5.8 BS >0.67 i.e. A <sub>sv</sub> / S	10% 0.46 70m suppor 8110 ignor 2011 1.00 0.84 VALID 169 N/A 0.92	N/mm <sup>2</sup> <i>st and</i> <i>ort and</i> <i>ed;)</i> mm <sup>2</sup> /m % N/mm <sup>2</sup> kN/m	
Ultimate sh Design she <i>Conservat</i> <i>comparing</i> Area of ten $v_w = 100A_s$ $v_c = (0.79)$ <b>Check v</b> <sub>d</sub>	hear stress ear stress, v <i>ively, shear</i> <i>against und</i> <i>against eni</i> hsile steel re $s_{prov,h}/bd_h$ (1.25)( $\rho_w f_{cu}$ <b>&lt; v<sub>c</sub> for no</b> Concrete s <b>&lt; v<sub>d</sub> &lt; 0.4</b> Provide no Concrete a	utilisation utilisation d=V/bd <sub>h</sub> r capacity e enhanced v <sub>c</sub> hanced v <sub>c</sub> hanced v <sub>c</sub> hanced v <sub>c</sub> hear capaci <b>links</b> hear capaci <b>+ v<sub>c</sub> for no</b> minal links nd nominal	$c_{c}$ as clause within 2d of nt provided, $(d_{h})^{1/4}$ ; $\rho_{w} <$ ity $v_{c}$ . $(bd_{h})$ <b>pminal link</b> such that A links shear	t by <b>eithe</b> 3.4.5.10 B f the support A <sub>s,prov,h</sub> 3; f <sub>cu</sub> <40;	r calculatir S8110 or t as clause (400/d <sub>h</sub> ) <sup>1/4</sup>	calculating 3.4.5.8 BS >0.67 i.e. A <sub>sv</sub> / S	10% 0.46 from suppor v d at supp 8110 ignor 2011 1.00 0.84 VALID 169 N/A 0.92 250	N/mm <sup>2</sup> <i>t and</i> <i>ort and</i> <i>ed;)</i> mm <sup>2</sup> /m % N/mm <sup>2</sup> kN/m mm <sup>2</sup> /mm/ kN/m	
Jltimate sh Design she <i>Conservat</i> <i>comparing</i> Area of ten $v_w = 100A_s$ $v_c = (0.79)$ <b>Check v</b> <sub>d</sub>	hear stress ar stress, v against und against und against eni hsile steel re $(1.25)(\rho_w f_{cu})$ $< v_c for no$ Concrete s $< v_d < 0.4$ Provide no Concrete a $> 0.4 + v_c$	utilisation v <sub>d</sub> =V/bd <sub>h</sub> r capacity e enhanced v hanced v <sub>c</sub> n einforcemer (25) <sup>1/3</sup> (400 links hear capaci + v <sub>c</sub> for nc minal links nd nominal for design	$c_{c}$ as clause within 2d of nt provided, $/d_{h})^{1/4}$ ; $\rho_{w} <$ ity $v_{c}$ . $(bd_{h})$ bominal link such that A links shear links	nt by <b>eithe</b> 3.4.5.10 B f the support A <sub>s,prov,h</sub> 3; f <sub>cu</sub> <40; 3; f <sub>cu</sub> <40; sv / S > 0.4 capacity (0	r calculatir S8110 or t as clause (400/d <sub>h</sub> ) <sup>1/4</sup> (400/d <sub>h</sub> ) <sup>1/4</sup> b/(0.95f <sub>yv</sub> ) 0.4 + v <sub>c</sub> ).(b	calculating 3.4.5.8 BS >0.67 i.e. A <sub>sv</sub> / S od <sub>h</sub> )	10% 0.46 rom suppor v d at supp 8110 ignor 2011 1.00 0.84 VALID 169 N/A 0.92 250 N/A	N/mm <sup>2</sup> t and ort and ed;) mm <sup>2</sup> /m % N/mm <sup>2</sup> kN/m mm <sup>2</sup> /mm/ kN/m	m
Jltimate sh Design she <i>Conservat</i> <i>comparing</i> Area of ten $v_w = 100A_s$ $v_c = (0.79)$ <b>Check v</b> <sub>d</sub>	hear stress ar stress, v against und against und against eni hsile steel re $_{3,prov,h}/bd_h$ (1.25)( $\rho_w f_{cu}$ < v <sub>c</sub> for no Concrete s < v <sub>d</sub> < 0.4 Provide no Concrete a > 0.4 + v <sub>c</sub>	utilisation utilisation r capacity e enhanced v hanced v c thanced v c hanced v c thanced	$c_{c}$ as clause within 2d of nt provided, $(d_{h})^{1/4}$ ; $\rho_{w} <$ ity v <sub>c</sub> .(bd <sub>h</sub> ) <b>pminal link</b> such that A links shear <b>links</b> , / S > b(v <sub>d</sub> )	$\frac{1}{1000} \frac{1}{1000} \frac{1}{1000$	r calculatir S8110 or t as clause (400/d <sub>h</sub> ) <sup>1/4</sup> (400/d <sub>h</sub> ) <sup>1/4</sup> b/(0.95f <sub>yv</sub> ) 0.4 + v <sub>c</sub> ).(t	calculating 3.4.5.8 BS >0.67 i.e. A <sub>sv</sub> / S od <sub>h</sub> ) S >	10% 0.46 70m suppor 8110 ignor 2011 1.00 0.84 VALID 169 0.92 250 N/A 0.92	N/mm <sup>2</sup> t and ort and ed;) mm <sup>2</sup> /m % N/mm <sup>2</sup> kN/m mm <sup>2</sup> /mm/ kN/m	m
Jltimate sh Design she <i>Conservat</i> <i>comparing</i> Area of ten $v_w = 100A_s$ $v_c = (0.79)$ <b>Check v</b> <sub>d</sub>	hear stress ar stress, v against und against und against eni hsile steel re $_{3,prov,h}/bd_h$ (1.25)( $\rho_w f_{cu}$ < v <sub>c</sub> for no Concrete s < v <sub>d</sub> < 0.4 Provide no Concrete a > 0.4 + v <sub>c</sub>	utilisation utilisation r capacity e enhanced v hanced v c thanced v c hanced v c thanced	$c_{c}$ as clause within 2d of nt provided, $/d_{h})^{1/4}$ ; $\rho_{w} <$ ity $v_{c}$ . $(bd_{h})$ bominal link such that A links shear links	$\frac{1}{1000} \frac{1}{1000} \frac{1}{1000$	r calculatir S8110 or t as clause (400/d <sub>h</sub> ) <sup>1/4</sup> (400/d <sub>h</sub> ) <sup>1/4</sup> b/(0.95f <sub>yv</sub> ) 0.4 + v <sub>c</sub> ).(t	calculating 3.4.5.8 BS >0.67 i.e. A <sub>sv</sub> / S od <sub>h</sub> ) S >	10% 0.46 70m suppor 8110 ignor 2011 1.00 0.84 VALID 169 0.92 250 N/A 0.92	N/mm <sup>2</sup> t and ort and ed;) mm <sup>2</sup> /m % N/mm <sup>2</sup> kN/m mm <sup>2</sup> /mm/ kN/m	m
Jltimate sh Design she Conservat comparing comparing Area of ten $v_w = 100A_s$ $v_c = (0.79)$ Check $v_d$ Check $v_c$	hear stress ear stress, v against und against und against eni against eni hsile steel re s,prov,h/bdh (1.25)( $\rho_w f_{cu}$ < v <sub>c</sub> for no Concrete s < v <sub>d</sub> < 0.4 Provide no Concrete a > 0.4 + v <sub>c</sub> Concrete a	utilisation vd=V/bdh r capacity e enhanced v hanced v c thanced thanced thanced thanced thanced thanced thanced thanced thanced thanced thanced thanced thance	enhancemer $r_c$ as clause within 2d of nt provided, /d <sub>h</sub> ) <sup>1/4</sup> ; $\rho_w <$ ty v <sub>c</sub> .(bd <sub>h</sub> ) by by by by by by c.(bd <sub>h</sub> ) by by c.(bd <sub>h</sub> ) by c.(bd <sub>h</sub> ) by c.(bd <sub>h</sub> ) by c.(bd <sub>h</sub> ) by c.(bd <sub>h</sub> ) c.(bd <sub>h</sub> )	$\frac{1}{1000} \frac{1}{1000} \frac{1}{1000$	r calculatir S8110 or t as clause (400/d <sub>h</sub> ) <sup>1/4</sup> (400/d <sub>h</sub> ) <sup>1/4</sup> b/(0.95f <sub>yv</sub> ) 0.4 + v <sub>c</sub> ).(t	calculating 3.4.5.8 BS >0.67 i.e. A <sub>sv</sub> / S od <sub>h</sub> ) S >	10% 0.46 rom suppor v <sub>d</sub> at supp 8110 ignor 2011 1.00 0.84 VALID 169 N/A 0.92 250 N/A 0.92 169	N/mm <sup>2</sup> t and ort and ed;) mm <sup>2</sup> /m % N/mm <sup>2</sup> kN/m kN/m mm <sup>2</sup> /mm/ kN/m mm <sup>2</sup> /mm/ kN/m	m
Ultimate sh Design she Conservate comparing Area of ten $v_w = 100A_s$ $v_c = (0.79)$ Check $v_d$ Check $v_d$ Check $v_d$	hear stress ar stress, v against und against und against enin hsile steel re $prov,h/bd_h$ (1.25)( $pwf_{cu}$ ( $v_c$ for no Concrete s vd < 0.4 Provide no Concrete a > 0.4 + $v_c$ Provide she Concrete a ded by all li	utilisation vd=V/bdh r capacity e enhanced v hanced v c thanced thanced thanced thanced thanced thanced thanced thanced thanced thanced thanced thanced thance	enhancemer $r_c$ as clause within 2d of nt provided, /d <sub>h</sub> ) <sup>1/4</sup> ; $\rho_w <$ ty v <sub>c</sub> .(bd <sub>h</sub> ) by by by by by by c.(bd <sub>h</sub> ) by by c.(bd <sub>h</sub> ) by c.(bd <sub>h</sub> ) by c.(bd <sub>h</sub> ) by c.(bd <sub>h</sub> ) by c.(bd <sub>h</sub> ) c.(bd <sub>h</sub> )	$\frac{1}{1000} \frac{1}{1000} \frac{1}{1000$	r calculatir S8110 or t as clause (400/d <sub>h</sub> ) <sup>1/4</sup> (400/d <sub>h</sub> ) <sup>1/4</sup> b/(0.95f <sub>yv</sub> ) 0.4 + v <sub>c</sub> ).(t	calculating 3.4.5.8 BS >0.67 i.e. A <sub>sv</sub> / S od <sub>h</sub> ) S >	10% 0.46 7 om suppor v d at supp 8110 ignor 2011 1.00 0.84 VALID 169 0.92 250 N/A 0.92 250 N/A 0.92 169 0	N/mm <sup>2</sup> t and ort and ed;) mm <sup>2</sup> /m % N/mm <sup>2</sup> kN/m mm <sup>2</sup> /mm/ kN/m mm <sup>2</sup> /mm/ kN/m	m m m
Ultimate sh Design she Conservate comparing trea of ten $w = 100A_s$ $r_c = (0.79)$ Check $v_d$ Check $v_d$ Check $v_d$ Check $v_d$	hear stress ar stress, v against und against und against und against end hsile steel re $s,prov,h/bd_h$ (1.25)( $\rho_w f_{cu}$ (1.25)( $\rho_w f_{cu}$ (	utilisation 'd=V/bd <sub>h</sub> r capacity e enhanced v hanced v <sub>c</sub> r einforcemer /25) <sup>1/3</sup> (400 links hear capaci + v <sub>c</sub> for nc minal links nd nominal for design ear links A <sub>sy</sub> nd design li nks per me	enhancemer $r_c$ as clause within 2d of ht provided, $(d_h)^{1/4}; \rho_w <$ ity $v_c.(bd_h)$ brinal link such that A links shear links shear of tre, $A_{sv,prov}$	$\frac{1}{1000} \frac{1}{1000} \frac{1}{1000$	r calculatir S8110 or t as clause (400/d <sub>h</sub> ) <sup>1/4</sup> (400/d <sub>h</sub> ) <sup>1/4</sup> b/(0.95f <sub>yv</sub> ) 0.4 + v <sub>c</sub> ).(t	calculating 3.4.5.8 BS >0.67 i.e. A <sub>sv</sub> / S od <sub>h</sub> ) S >	10% 0.46 rom suppor v <sub>d</sub> at supp 8110 ignor 2011 1.00 0.84 VALID 169 N/A 0.92 250 N/A 0.92 169 0 0 0.00	N/mm <sup>2</sup> t and ort and ed;) mm <sup>2</sup> /m % N/mm <sup>2</sup> kN/m mm <sup>2</sup> /mm/ kN/m mm <sup>2</sup> /mm/ kN/m mm <sup>2</sup> /mm/ mm <sup>2</sup> /mm/	m m m m
Jltimate sh Design she Conservate comparing Area of ten $v_w = 100A_s$ $v_c = (0.79)$ Check $v_d$ Check $v_d$ Check $v_d$ Check $v_d$	hear stress ar stress, v against und against und against enin hsile steel re $prov,h/bd_h$ (1.25)( $pwf_{cu}$ ( $v_c$ for no Concrete s vd < 0.4 Provide no Concrete a > 0.4 + $v_c$ Provide she Concrete a ded by all li	utilisation 'd=V/bd <sub>h</sub> r capacity e enhanced v hanced v <sub>c</sub> r einforcemer /25) <sup>1/3</sup> (400 links hear capaci + v <sub>c</sub> for nc minal links nd nominal for design ear links A <sub>sy</sub> nd design li	enhancemer $r_c$ as clause within 2d of ht provided, $(d_h)^{1/4}; \rho_w <$ ity $v_c.(bd_h)$ brinal link such that A links shear links shear of tre, $A_{sv,prov}$	$\frac{1}{1000} \frac{1}{1000} \frac{1}{1000$	r calculatir S8110 or t as clause (400/d <sub>h</sub> ) <sup>1/4</sup> (400/d <sub>h</sub> ) <sup>1/4</sup> b/(0.95f <sub>yv</sub> ) 0.4 + v <sub>c</sub> ).(t	calculating 3.4.5.8 BS >0.67 i.e. A <sub>sv</sub> / S od <sub>h</sub> ) S >	10% 0.46 7 om suppor v d at supp 8110 ignor 2011 1.00 0.84 VALID 169 0.92 250 N/A 0.92 250 N/A 0.92 169 0	N/mm <sup>2</sup> t and ort and ed;) mm <sup>2</sup> /m % N/mm <sup>2</sup> kN/m mm <sup>2</sup> /mm/ kN/m mm <sup>2</sup> /mm/ kN/m mm <sup>2</sup> /mm/ mm <sup>2</sup> /mm/	m m m
Jltimate sh Design she Conservate comparing Area of ten $v_w = 100A_s$ $v_c = (0.79)$ Check $v_d$ Check $v_d$ Check $v_d$ Check $v_d$	hear stress ar stress, v against und against und against und against end hsile steel re $s,prov,h/bd_h$ (1.25)( $\rho_w f_{cu}$ (1.25)( $\rho_w f_{cu}$ (	utilisation 'd=V/bd <sub>h</sub> r capacity e enhanced v hanced v <sub>c</sub> r einforcemer /25) <sup>1/3</sup> (400 links hear capaci + v <sub>c</sub> for nc minal links nd nominal for design ear links A <sub>sy</sub> nd design li	enhancemer $r_c$ as clause within 2d of ht provided, $(d_h)^{1/4}; \rho_w <$ ity $v_c.(bd_h)$ brinal link such that A links shear links shear of tre, $A_{sv,prov}$	$\frac{1}{1000} \frac{1}{1000} \frac{1}{1000$	r calculatir S8110 or t as clause (400/d <sub>h</sub> ) <sup>1/4</sup> (400/d <sub>h</sub> ) <sup>1/4</sup> b/(0.95f <sub>yv</sub> ) 0.4 + v <sub>c</sub> ).(t	calculating 3.4.5.8 BS >0.67 i.e. A <sub>sv</sub> / S od <sub>h</sub> ) S >	10% 0.46 rom suppor v <sub>d</sub> at supp 8110 ignor 2011 1.00 0.84 VALID 169 N/A 0.92 250 N/A 0.92 169 0 0 0.00	N/mm <sup>2</sup> t and ort and ed;) mm <sup>2</sup> /m % N/mm <sup>2</sup> kN/m mm <sup>2</sup> /mm/ kN/m mm <sup>2</sup> /mm/ kN/m mm <sup>2</sup> /mm/ mm <sup>2</sup> /mm/	m m m m
Jltimate sh Design she <i>Conservat</i> <i>comparing</i> Area of ten $v_w = 100A_s$ $v_c = (0.79)$ <b>Check v</b> <sub>d</sub> • <b>Check v</b> <sub>d</sub> • <b>Check v</b> <sub>d</sub> •	hear stress ar stress, v against und against und against und against end hsile steel re $s,prov,h/bd_h$ (1.25)( $\rho_w f_{cu}$ (1.25)( $\rho_w f_{cu}$ (	utilisation 'd=V/bd <sub>h</sub> r capacity e enhanced v hanced v <sub>c</sub> r einforcemer /25) <sup>1/3</sup> (400 links hear capaci + v <sub>c</sub> for nc minal links nd nominal for design ear links A <sub>sy</sub> nd design li	enhancemer $r_c$ as clause within 2d of ht provided, $(d_h)^{1/4}; \rho_w <$ ity $v_c.(bd_h)$ brinal link such that A links shear links shear of tre, $A_{sv,prov}$	$\frac{1}{1000} \frac{1}{1000} \frac{1}{1000$	r calculatir S8110 or t as clause (400/d <sub>h</sub> ) <sup>1/4</sup> (400/d <sub>h</sub> ) <sup>1/4</sup> b/(0.95f <sub>yv</sub> ) 0.4 + v <sub>c</sub> ).(t	calculating 3.4.5.8 BS >0.67 i.e. A <sub>sv</sub> / S od <sub>h</sub> ) S >	10% 0.46 rom suppor v <sub>d</sub> at supp 8110 ignor 2011 1.00 0.84 VALID 169 N/A 0.92 250 N/A 0.92 169 0 0 0.00	N/mm <sup>2</sup> t and ort and ed;) mm <sup>2</sup> /m % N/mm <sup>2</sup> kN/m mm <sup>2</sup> /mm/ kN/m mm <sup>2</sup> /mm/ kN/m mm <sup>2</sup> /mm/ mm <sup>2</sup> /mm/	m m m m
Ultimate sh Design she Conservat comparing Area of ten $D_w = 100A_s$ $V_c = (0.79)$ Check $v_d$ Check $v_d$ Check $v_d$ Check $v_d$	hear stress ar stress, v against und against und against und against end hsile steel re $s,prov,h/bd_h$ (1.25)( $\rho_w f_{cu}$ (1.25)( $\rho_w f_{cu}$ (	utilisation 'd=V/bd <sub>h</sub> r capacity e enhanced v hanced v <sub>c</sub> r einforcemer /25) <sup>1/3</sup> (400 links hear capaci + v <sub>c</sub> for nc minal links nd nominal for design ear links A <sub>sy</sub> nd design li	enhancemer $r_c$ as clause within 2d of ht provided, $(d_h)^{1/4}; \rho_w <$ ity $v_c.(bd_h)$ brinal link such that A links shear links shear of tre, $A_{sv,prov}$	$\frac{1}{1000} \frac{1}{1000} \frac{1}{1000$	r calculatir S8110 or t as clause (400/d <sub>h</sub> ) <sup>1/4</sup> (400/d <sub>h</sub> ) <sup>1/4</sup> b/(0.95f <sub>yv</sub> ) 0.4 + v <sub>c</sub> ).(t	calculating 3.4.5.8 BS >0.67 i.e. A <sub>sv</sub> / S od <sub>h</sub> ) S >	10% 0.46 rom suppor v <sub>d</sub> at supp 8110 ignor 2011 1.00 0.84 VALID 169 N/A 0.92 250 N/A 0.92 169 0 0 0.00	N/mm <sup>2</sup> t and ort and ed;) mm <sup>2</sup> /m % N/mm <sup>2</sup> kN/m mm <sup>2</sup> /mm/ kN/m mm <sup>2</sup> /mm/ kN/m mm <sup>2</sup> /mm/ mm <sup>2</sup> /mm/	m m m m
Ultimate sh Design she (Conservate comparing) Area of ten $D_w = 100A_s$ $V_c = (0.79)$ Check $v_d$ Check $v_d$ Check $v_d$ Check $v_d$ Check $v_d$	hear stress ar stress, v against und against und against und against end hsile steel re $s,prov,h/bd_h$ (1.25)( $\rho_w f_{cu}$ (1.25)( $\rho_w f_{cu}$ (	utilisation 'd=V/bd <sub>h</sub> r capacity e enhanced v hanced v <sub>c</sub> r einforcemer /25) <sup>1/3</sup> (400 links hear capaci + v <sub>c</sub> for nc minal links nd nominal for design ear links A <sub>sy</sub> nd design li	enhancemer $r_c$ as clause within 2d of ht provided, $(d_h)^{1/4}; \rho_w <$ ity $v_c.(bd_h)$ brinal link such that A links shear links shear of tre, $A_{sv,prov}$	$\frac{1}{1000} \frac{1}{1000} \frac{1}{1000$	r calculatir S8110 or t as clause (400/d <sub>h</sub> ) <sup>1/4</sup> (400/d <sub>h</sub> ) <sup>1/4</sup> b/(0.95f <sub>yv</sub> ) 0.4 + v <sub>c</sub> ).(t	calculating 3.4.5.8 BS >0.67 i.e. A <sub>sv</sub> / S od <sub>h</sub> ) S >	10% 0.46 rom suppor v <sub>d</sub> at supp 8110 ignor 2011 1.00 0.84 VALID 169 N/A 0.92 250 N/A 0.92 169 0 0 0.00	N/mm <sup>2</sup> t and ort and ed;) mm <sup>2</sup> /m % N/mm <sup>2</sup> kN/m mm <sup>2</sup> /mm/ kN/m mm <sup>2</sup> /mm/ kN/m mm <sup>2</sup> /mm/ mm <sup>2</sup> /mm/	m m m m
Ultimate sh Design she (Conservate comparing) Area of ten $D_w = 100A_s$ $V_c = (0.79)$ Check $v_d$ Check $v_d$ Check $v_d$ Check $v_d$ Check $v_d$	hear stress ar stress, v against und against und against und against end hsile steel re $s,prov,h/bd_h$ (1.25)( $\rho_w f_{cu}$ (1.25)( $\rho_w f_{cu}$ (	utilisation 'd=V/bd <sub>h</sub> r capacity e enhanced v hanced v <sub>c</sub> r einforcemer /25) <sup>1/3</sup> (400 links hear capaci + v <sub>c</sub> for nc minal links nd nominal for design ear links A <sub>sy</sub> nd design li	enhancemer $r_c$ as clause within 2d of ht provided, $(d_h)^{1/4}; \rho_w <$ ity $v_c.(bd_h)$ brinal link such that A links shear links shear of tre, $A_{sv,prov}$	$\frac{1}{1000} \frac{1}{1000} \frac{1}{1000$	r calculatir S8110 or t as clause (400/d <sub>h</sub> ) <sup>1/4</sup> (400/d <sub>h</sub> ) <sup>1/4</sup> b/(0.95f <sub>yv</sub> ) 0.4 + v <sub>c</sub> ).(t	calculating 3.4.5.8 BS >0.67 i.e. A <sub>sv</sub> / S od <sub>h</sub> ) S >	10% 0.46 rom suppor v <sub>d</sub> at supp 8110 ignor 2011 1.00 0.84 VALID 169 N/A 0.92 250 N/A 0.92 169 0 0 0.00	N/mm <sup>2</sup> t and ort and ed;) mm <sup>2</sup> /m % N/mm <sup>2</sup> kN/m mm <sup>2</sup> /mm/ kN/m mm <sup>2</sup> /mm/ kN/m mm <sup>2</sup> /mm/ mm <sup>2</sup> /mm/	m m m m
Ultimate sh Design she (Conservate comparing) Area of ten $D_w = 100A_s$ $V_c = (0.79)$ Check $v_d$ Check $v_d$ Check $v_d$ Check $v_d$ Check $v_d$	hear stress ar stress, v against und against und against und against end hsile steel re s,prov,h/bdh $(1.25)(\rho_w f_{cu}$ $< v_c for noConcrete s< v_d < 0.4Provide noConcrete a> 0.4 + v_cProvide sheConcrete aded by all linov / S value$	utilisation 'd=V/bd <sub>h</sub> r capacity e enhanced v hanced v <sub>c</sub> r einforcemer /25) <sup>1/3</sup> (400 links hear capaci + v <sub>c</sub> for nc minal links nd nominal for design ear links A <sub>sy</sub> nd design li	enhancemer $r_c$ as clause within 2d of ht provided, $(d_h)^{1/4}; \rho_w <$ ity $v_c.(bd_h)$ brinal link such that A links shear links shear of tre, $A_{sv,prov}$	$\frac{1}{1000} \frac{1}{1000} \frac{1}{1000$	r calculatir S8110 or t as clause (400/d <sub>h</sub> ) <sup>1/4</sup> (400/d <sub>h</sub> ) <sup>1/4</sup> b/(0.95f <sub>yv</sub> ) 0.4 + v <sub>c</sub> ).(t	calculating 3.4.5.8 BS >0.67 i.e. A <sub>sv</sub> / S od <sub>h</sub> ) S >	10% 0.46 rom suppor v <sub>d</sub> at supp 8110 ignor 2011 1.00 0.84 VALID 169 N/A 0.92 250 N/A 0.92 169 0 0 0.00	N/mm <sup>2</sup> t and ort and ed;) mm <sup>2</sup> /m % N/mm <sup>2</sup> kN/m mm <sup>2</sup> /mm/ kN/m mm <sup>2</sup> /mm/ kN/m mm <sup>2</sup> /mm/ mm <sup>2</sup> /mm/	m m m m
Ultimate sh Design she (Conservate comparing) Area of ten $D_w = 100A_s$ $V_c = (0.79)$ Check $v_d$ Check $v_d$ Check $v_d$ Check $v_d$ Check $v_d$	hear stress ar stress, v against und against und against und against end hsile steel re s,prov,h/bdh $(1.25)(\rho_w f_{cu}$ $< v_c for noConcrete s< v_d < 0.4Provide noConcrete a> 0.4 + v_cProvide sheConcrete aded by all linov / S value$	utilisation 'd=V/bd <sub>h</sub> r capacity e enhanced v hanced v <sub>c</sub> r einforcemer /25) <sup>1/3</sup> (400 links hear capaci + v <sub>c</sub> for nc minal links nd nominal for design ear links A <sub>sy</sub> nd design li	enhancemer $r_c$ as clause within 2d of ht provided, $(d_h)^{1/4}; \rho_w <$ ity $v_c.(bd_h)$ brinal link such that A links shear links shear of tre, $A_{sv,prov}$	$\frac{1}{1000} \frac{1}{1000} \frac{1}{1000$	r calculatir S8110 or t as clause (400/d <sub>h</sub> ) <sup>1/4</sup> (400/d <sub>h</sub> ) <sup>1/4</sup> b/(0.95f <sub>yv</sub> ) 0.4 + v <sub>c</sub> ).(t	calculating 3.4.5.8 BS >0.67 i.e. A <sub>sv</sub> / S od <sub>h</sub> ) S >	10% 0.46 rom suppor v <sub>d</sub> at supp 8110 ignor 2011 1.00 0.84 VALID 169 N/A 0.92 250 N/A 0.92 169 0 0 0.00	N/mm <sup>2</sup> t and ort and ed;) mm <sup>2</sup> /m % N/mm <sup>2</sup> kN/m mm <sup>2</sup> /mm/ kN/m mm <sup>2</sup> /mm/ kN/m mm <sup>2</sup> /mm/ mm <sup>2</sup> /mm/	m m m m
Ultimate sh Design she Conservat comparing Area of ten $D_w = 100A_s$ $V_c = (0.79)$ Check $v_d$ Check $v_d$ Check $v_d$ Check $v_d$	hear stress ar stress, v against und against und against und against end hsile steel re s,prov,h/bdh $(1.25)(\rho_w f_{cu}$ $< v_c for noConcrete s< v_d < 0.4Provide noConcrete a> 0.4 + v_cProvide sheConcrete aded by all linov / S value$	utilisation 'd=V/bd <sub>h</sub> r capacity e enhanced v hanced v <sub>c</sub> r einforcemer /25) <sup>1/3</sup> (400 links hear capaci + v <sub>c</sub> for nc minal links nd nominal for design ear links A <sub>sy</sub> nd design li	enhancemer $r_c$ as clause within 2d of ht provided, $(d_h)^{1/4}; \rho_w <$ ity $v_c.(bd_h)$ brinal link such that A links shear links shear of tre, $A_{sv,prov}$	$\frac{1}{1000} \frac{1}{1000} \frac{1}{1000$	r calculatir S8110 or t as clause (400/d <sub>h</sub> ) <sup>1/4</sup> (400/d <sub>h</sub> ) <sup>1/4</sup> b/(0.95f <sub>yv</sub> ) 0.4 + v <sub>c</sub> ).(t	calculating 3.4.5.8 BS >0.67 i.e. A <sub>sv</sub> / S od <sub>h</sub> ) S >	10% 0.46 rom suppor v <sub>d</sub> at supp 8110 ignor 2011 1.00 0.84 VALID 169 N/A 0.92 250 N/A 0.92 169 0 0 0.00	N/mm <sup>2</sup> t and ort and ed;) mm <sup>2</sup> /m % N/mm <sup>2</sup> kN/m mm <sup>2</sup> /mm/ kN/m mm <sup>2</sup> /mm/ kN/m mm <sup>2</sup> /mm/ mm <sup>2</sup> /mm/	m m m m

CON	SUI TINC	Enginoorin	g Calculatio	n Shoot		Job No.	Sheet No.		Rev.
	N E E R S			n Sheet		jXXX	1	1	
			-			Member/Location			
Job Title	Member De	esian - Rein	forced Con	crete One V	Vav Spanni	Drg.			
			anning Slal		ray opunn	Made by XX	Date 21	/11/2021	hd.
					_				
Detailing	Requireme	ents							
All dotailing	g requireme	nte mot 2					ОК		
	Jiequiieine	ints met :					OK		
Max saggin	ig steel rein	forcement	pitch (<3d <sub>s</sub>	, <750mm)	)		100	mm	ОК
Max hoggir	ng steel reir	nforcement	pitch (<3d <sub>r</sub>	, <750mm	)		100	mm	ОК
Maxi	mum pitch o	of bars: (Not	ation as for l	BS 8110)					
		%A,/			m Pitch (m	n)			
	Main bar	s: 0.5 o	rless	300					
			r more	150					
		c.							
	ng steel rein ng steel reir							mm mm	ОК ОК
max nogyll	ig steel tell	norcement	piteri				100		OK
Min saggin	g steel rein	forcement p	pitch (>75m	nm+∳s, >10	l0mm+∳₅ if	T40)	100	mm	ОК
Min hoggin	g steel rein	forcement	pitch (>75n	nm+ $\phi_h$ , >10	00mm+ <sub>¢h</sub> if	<sup>-</sup> T40)		mm	ОК
Note an all	owance has	s been mad	e for laps ir	n the min p	itch by incr	easing the o	criteria by t	he bar dian	neter.
% May car	ging reinfoi	rement (~	- 0 04bb)				0.45	0/0	ОК
	ging reinfor						0.45		OK OK
	iging renno						0.00		
			heter, $\phi_s$ (>				12	mm	ОК
Hogging st	eel reinforc	ement diam	heter, $\phi_h$ (>	=6mm)			16	mm	ОК
					<u></u>				
					<u> </u>				

CON	SULTING	Engineerin	g Calculatio	n Sheet		Job No.	Sheet No.		Rev.
ENGI	N E E R S	Consulting	Engineers			jXXX	1	2	
						Member/Location			<u> </u>
ob Title	Member De	sian - Reir	forced Con	crete One V	Vav Spanni				
			panning Slal		ray opanni	Made by XX	Date <b>21</b>	/11/2021	Ghd.
Deflection	Criteria								
							<b></b>		
Span, l Span, l / ef	fective dep	oth, d₅ ratio					5.000 <b>24.5</b>		
lasic snan	/ effective	denth ratio	criteria (20	) precast or	single snar	n; 23 edge;	23.0		
	1,span more or l				Include	., <u>_</u> <u></u> <u></u> <b>↓</b>	1.00		
1odificatio	n factor for	tension C <sub>2</sub>							
	$M_{sag}/bd_{s}^{2}$						1.94	N/mm <sup>2</sup>	
	$2f_yA_z$	reg 1	(- · · -					2	
	$f_{\rm s} = \frac{2f_{\rm y}A_{\rm s}}{3A_{\rm s}}$	$\overline{\beta}_{\rm arov} \times \overline{\beta}_{\rm b}$	(β <sub>b</sub> =1.2 un	lless precas	t, single sp	an or contir	263	N/mm <sup>2</sup>	
			(477 f)						
	Modificatio	0.55 +	$\frac{(477 - f_s)}{20 (0.9 + \frac{M}{bd})}$	_ ≤ 2.0			1.18		
			0.0 + <u>bd</u>	2)			•		1
lodified sp	oan / effecti	ive depth ra	atio criteria				27.1		
Deflection	utilisation						91%		ОК
1									



CON	SULTING	Engineerin	g Calculatio	n Sheet		Job No.	Sheet No.		Rev.
		Consulting				jXXX	1	4	
						Member/Location			
					<u> </u>				
			nforced Con		Way Spanni	Made by	Data •	(11 (2024)	dbd
ember De	esign - RC (	One way Sp	oanning Slal	D		Made by XX	<sup>Date</sup> 21	/11/2021	onu.
<u> </u>									
eam Sec		t Descripti	оп						
•	Beam								
А.	Deam								
			Depth		Width		Sag Section	on	
	Continuo		slab + dow	instand			T - continu		
	Precast	43 	downstand				Rect - cont		
	FICCUSE		uownstanu						
В.	Beam at F	Edge of Sla	ab Span						
			Depth		Width		Sag Section	on	
	Continuo	us	slab + dow	Instand	b <sub>w</sub>		L - continu		
	Precast		downstand		b <sub>w</sub>		Rect - cont		
C.	Edge Bea	m							
	-								
			Depth		Width		Sag Section	on	
	Continuo	us							
	No downst	and	slab		b <sub>eff</sub>		Rect - cont	tinuous	
	With down	stand	slab + dow	instand	b <sub>w</sub>		L - continu	ous	
	Precast								
	No downst		slab		b <sub>eff</sub>		Rect - cont		
	With down	stand	downstand	1	b <sub>w</sub>		Rect - cont	tinuous	
					-				
					ļ				
					ļ				ļ
	1	1	1		1	1			1

	CON									Job	No.	Sheet	t No.		Re	v.
F						g Calculat Engineers		et			XX			.5		
Ľ	IT UI		2 11 3		9	gincer	-						1			
	<b>T</b> 111 -	Marak	D.		Daind	former of Co				Membe Drg.	er/Location					
	Title			_		anning Sl		Jne w	'ay Spanni	Made b	y XX	Date	21	/11/2	<b>071</b> <sup>Chd.</sup>	
icii		sign	KC C		iy Sp								21	/ 1 1 / 2	021	
Гурі	ical In	itial S	Span	/ Effe	ctive	Depth F	Ratios									
	Table 3 Span/effective depth ratios for initial design of slabs															
				One-way spannin				Two-v	Two-way spann		ning		it slab			
				simply co upported		ntinuous	cantile	ever	simply supported	continuous		JOUS .				
			23			30	11		30		39			28		
	10.0	)	21			27	10		27		35		25			
qu				nould be tld be us		d on the l	onger spa	ın dim	ension, For	exter	ior pan	els, 85	% of 1	the ratio	s	
-						uoted in T	able 3 sl	10uld b	e used.							
						ay spanni				S	pans ir	the r	ange	4 to 1	0 m.	
	mpose kN/m <sup>2</sup>		, Q <sub>k</sub>	s	ingle	span		Mul	tiple span			Cantile				
	2.5			2	7			32			1	0				
	5.0			2	5			30				9			-	
	7.5			2	4			28				8			-	
	10.0			2	23			27				7				
Sn	an to	depth	ratio	s for ril	bbod	clabe	-			snan	s are ir	the r	ango	6 to 1	2 m	
-	mpose	-								opani	Jaren					
	2 <sub>k</sub> (kN/					-	by beams <sup>a</sup>					Ribs integra with band b			m	
				Single <12 m				e span	_		12 m		<11 m			
	2.5			24			<10 m 29		27	· 12 m	1	25				
	2.5 5.0			24 21			29 27		27			23				
	7.5			19			25		24			21			_	
	10.0			17			23		17			18			-	
к	(ey	to Sect	tion 2.		deter	rmine dep		ims					-		E	
															J	
		1		1				1		1						

CONSULTING Engineering Calculation Sheet						Job No. Sheet No.				
		Consulting			jXXX	jXXX 16				
						Member/Location				
b Title Member Design - Rein ember Design - RC One Way S					annii <sup>Drg.</sup> <sup>Made by</sup> XX	Date <b>21/1</b>	1/2021 <sup>Chd.</sup>			
nder De	esign - RC (	Jne way Sp	banning Slac		Made by XX	21/1				
				_						
Table 1:										
Span/de		for insitu co								
		ls's Reinfor s Handbook								
Slab type		5 kN/m <sup>2</sup> Imposed	10 kN/m <sup>2</sup> Imposed							
		load	load							
Simply supported one-way		27	24							
Simply supported two-way		30	27							
Continuous one-way		34	30							
Continuous two-way		44	40							
Cantilever		11	10							
Flat slab 30		30	27							
Table 2:	Estimated	depths of in	nsitu concre	te slabs spanning	one way betwe	en down-stand	beams			
Span		4m	5m	6m	7m	8m				
Single span thi		ckness	150mm	175mm	225mm	250mm	300mm			
Mu	ulti span thic	kness	125mm	150mm	175mm	200mm	250mm			
						20011111	2001111			
						20011111				
						2001111				
9m	1	Om								
<b>9m</b> 350m		Om Omm								
	m 45									
350m 300m	m 45 m 32	Omm 5mm	nsitu concre	te slabs spanning	one way betwe					
350m 300m	m 45 m 32	Omm 5mm	nsitu concre 4m	te slabs spanning	one way betwe					
350m 300m Table 3:	m 45 m 32 Estimated	Omm 5mm depths of <i>i</i>		5m		en band-beam	s			
350m 300m <b>Table 3:</b> Mu	m 45 m 32 Estimated Span	Omm 5mm depths of <i>in</i> kness	4m	<b>5m</b> 125mm	6m	en band-beam	s 8m			
350m 300m <b>Table 3:</b> Mu	m 45 m 32 Estimated Span	Omm 5mm depths of <i>in</i> kness	4m 125mm	<b>5m</b> 125mm	6m 125mm	en band-beam	s 200mm			
350m 300m <b>Table 3:</b> Mu	m 45 m 32 Estimated Span	Omm 5mm depths of <i>in</i> kness	4m 125mm	<b>5m</b> 125mm	6m 125mm	en band-beam	s 200mm			
350m 300m <b>Table 3:</b> Mu	m 45 m 32 Estimated Span Ilti span thic	Omm 5mm depths of <i>in</i> kness	4m 125mm	<b>5m</b> 125mm	6m 125mm	en band-beam	s 200mm			
350m 300m Table 3: Mu Er	m 45 m 32 Estimated Span ulti span thic nd span thic	Omm 5mm depths of <i>in</i> kness kness	4m 125mm	<b>5m</b> 125mm	6m 125mm	en band-beam	s 200mm			
350m 300m Table 3: Mu Er 9m	m 45 m 32 Estimated Span ulti span thic nd span thic 1 m 22	Omm 5mm depths of <i>i</i> kness kness	4m 125mm	<b>5m</b> 125mm	6m 125mm	en band-beam	s 200mm			
350m 300m Table 3: Mu Er 9m 200m	m 45 m 32 Estimated Span ulti span thic nd span thic 1 m 22	Omm 5mm depths of <i>i</i> kness kness IOm	4m 125mm	<b>5m</b> 125mm	6m 125mm	en band-beam	s 200mm			
350m 300m Table 3: Mu Er 9m 200m	m 45 m 32 Estimated Span ulti span thic nd span thic 1 m 22	Omm 5mm depths of <i>i</i> kness kness IOm	4m 125mm	<b>5m</b> 125mm	6m 125mm	en band-beam	s 200mm			

CON	SULTING	Engineerin	a Calculatio	n Shoot		Job No	ob No. Sheet No.			Rev.				
		Engineering Calculation Sheet Consulting Engineers				jXXX			1	.7				
									-		<u> </u>			
						Member/Lo	ocation							
Job Title		esign - Rein			Vay Spanni	Drg. Made by		Data		111 10001	bd			
Member D	esign - RC (	One Way Sp	banning Slai	0		wade by	XX	Date	21	/11/2021	nu.			
0	Cronning	Dibbod Cla												
	Spanning	Ribbed Sla	D											
way spani	ning solid si	-			-	-					nt one			
-2. The <b>dii</b>	mensions (	of the one w	ay spanning	g ribbed sla	b should m	eet the	e follo	owing cri	ter	ia:-				
(b) rib wid (c) rib dep (d) toppin (e) solid s	<ul> <li>(a) rib pitch &lt;= 1500mm</li> <li>(b) rib width with one bar &gt;= 75mm, rib width with two bars &gt;= <b>125mm</b></li> <li>(c) rib depth (below topping slab) &lt;= 4 x rib width (for avoidance of LTB effects)</li> <li>(d) topping slab thickness &gt;= <b>50mm</b> AND &gt;= 1/10th of the rib clear distance (not rib pitch)</li> <li>(e) solid slab the full thickness of the topping slab and the depth of the rib extending for a certain short distance from face of the support is required;</li> </ul>													
	3. The <b>design</b> of the one way spanning ribbed slab should incorporate the following with design moment and shear coefficients as per one way spanning solid slab:-													
		ging mon				f a <b>T-s</b>	secti	<b>on</b> locat	ed	at the po	int of			
Tributary -Span = er -Flange wid Flange de Web widtl	loading wid ntire span o dth = rib pi pth = toppi h = rib widt	tch ng slab thic	ch kness		or span									
ribbed sla Tributary Span = sp	b changes i loading wid oan of ribbe	<b>ging mome</b> nto the solid th = rib pitc d floor only	d slab ch	_		ngular	sec	<b>tion</b> loca	ited	d at the poin	nt the			
(c) <b>solid</b>	opping slab <b>slab desig</b>	thickness - n: hogging	g moment	and shear	<b>design</b> of		tang	ular sec	ctic	on located a	at the			
-Tributary -Span = ei	loading wid ntire span o	th = arbitra f floor		ε σαρροιτ οι	the noor sp	Dan								
	orbitrary me copping slab	tre thickness -	+ rib depth	(below topp	oing slab)									
at the poi	(d) <b>topping slab design: sagging moment and deflection design</b> of a <b>rectangular section</b> located at the point of maximum sagging moment, i.e. the midspan of the topping slab span Tributary loading width = arbitrary metre													
	b pitch orbitrary me opping slab													
(e) tonni	na slah da	sian: hog	aina mom	ent and ch	ear decim	<b>n</b> of a	rect	anaular	S.	ection local	ed at			
(e) <b>topping slab design: hogging moment and shear design</b> of a <b>rectangular section</b> located at														
	rbitrary me													
Depth = topping slab thickness;														
4. The <b>minimum steel reinforcement</b> within the rib is 0.13% (high yield) or 0.24% (mild) of rib width x (topping slab thickness + rib depth (below topping slab)). Also the minimum bar diameter in a rib is 16mm. The minimum steel reinforcement within the topping slab is 0.12%;														