

Company:		Page:	1
Address:		Specifier:	
Phone   Fax:		E-mail:	
Design:	C2000-01 10H32@180	Date:	10.01.2024
Rebar application:			

## Specifier's comments:

# 1. Input data

## General

Design method	EN 1992-1-1:2004 + AC:2010
Consider the effect of $\Delta F_{Td}$	yes
Verification of interface shear	6.2.5
Consider compression reinforcement for CSD	no
Application type	Beam to wall
Continuous in X	yes
Loading type	Static
Design for yield	no
Design working life	50 years



## Product

Mortar	<b>HIT-RE 500 V4</b>
Item number	2287557 HIT-RE 500 V4 (adhesive)
UK Technical Assessment	UKTA-0836-22/6577
Issued	28.03.2023
Installation	Hammer drilling (HD), Installation Condition: Dry Concrete
Drilling direction	Drilling aid is used (this improves the angle of drilling)

## Material and Geometry

Existing concrete	C40/50, $f_{ck} = 40 \text{ N/mm}^2$
New concrete	C40/50, $f_{ck} = 40 \text{ N/mm}^2$
Joint roughness	Rough
Interface between new and old concrete	Rectangular cross section, width = 850 mm, height = 2,000 mm
Length of existing concrete	1,200 mm
Temperature	During installation: from 5°C to 20°C; During service: 20 °C / 20 °C (short / long term)
Concrete reinforcement	Wide

## Post-installed rebar

Company:

Page:

2

Address:

Specifier:

Phone | Fax: |

E-mail:

Design:

C2000-01 10H32@180

Date:

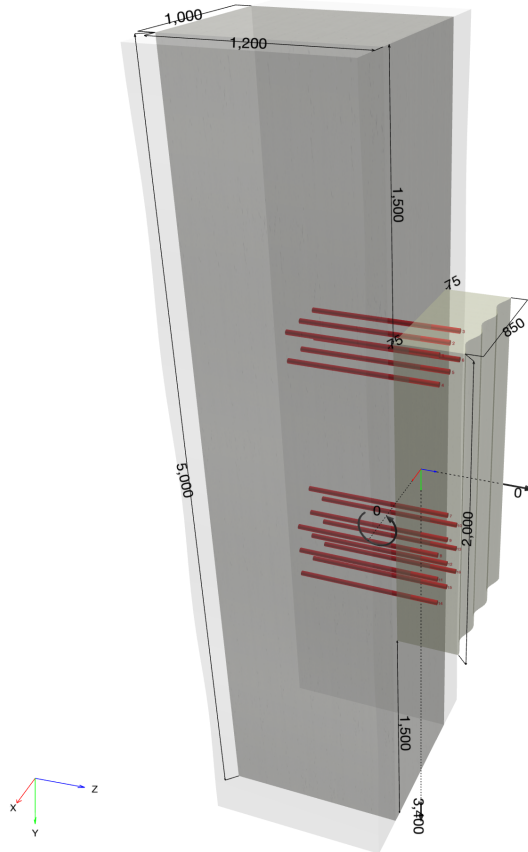
10.01.2024

Rebar application:

	Diameter	Coordinate X	Coordinate Y	Bond	$f_{yk}$	Drilling length ( $l_v$ )
1	32mm	-180 mm	855 mm	Good	500.00 N/mm <sup>2</sup>	758 mm
2	32mm	0 mm	855 mm	Good	500.00 N/mm <sup>2</sup>	758 mm
3	32mm	180 mm	855 mm	Good	500.00 N/mm <sup>2</sup>	758 mm
4	32mm	-180 mm	675 mm	Good	500.00 N/mm <sup>2</sup>	758 mm
5	32mm	0 mm	675 mm	Good	500.00 N/mm <sup>2</sup>	758 mm
6	32mm	180 mm	675 mm	Good	500.00 N/mm <sup>2</sup>	758 mm
7	32mm	0 mm	-295 mm	Good	500.00 N/mm <sup>2</sup>	758 mm
8	32mm	-180 mm	-475 mm	Good	500.00 N/mm <sup>2</sup>	758 mm
9	32mm	0 mm	-475 mm	Good	500.00 N/mm <sup>2</sup>	758 mm
10	32mm	180 mm	-475 mm	Good	500.00 N/mm <sup>2</sup>	758 mm
11	32mm	-180 mm	-655 mm	Good	500.00 N/mm <sup>2</sup>	758 mm
12	32mm	0 mm	-655 mm	Good	500.00 N/mm <sup>2</sup>	758 mm
13	32mm	180 mm	-655 mm	Good	500.00 N/mm <sup>2</sup>	758 mm
14	32mm	-180 mm	-835 mm	Good	500.00 N/mm <sup>2</sup>	758 mm
15	32mm	0 mm	-835 mm	Good	500.00 N/mm <sup>2</sup>	758 mm
16	32mm	180 mm	-835 mm	Good	500.00 N/mm <sup>2</sup>	758 mm
<b>Final drilling length (<math>l_v</math>)</b>						<b>758 mm</b>

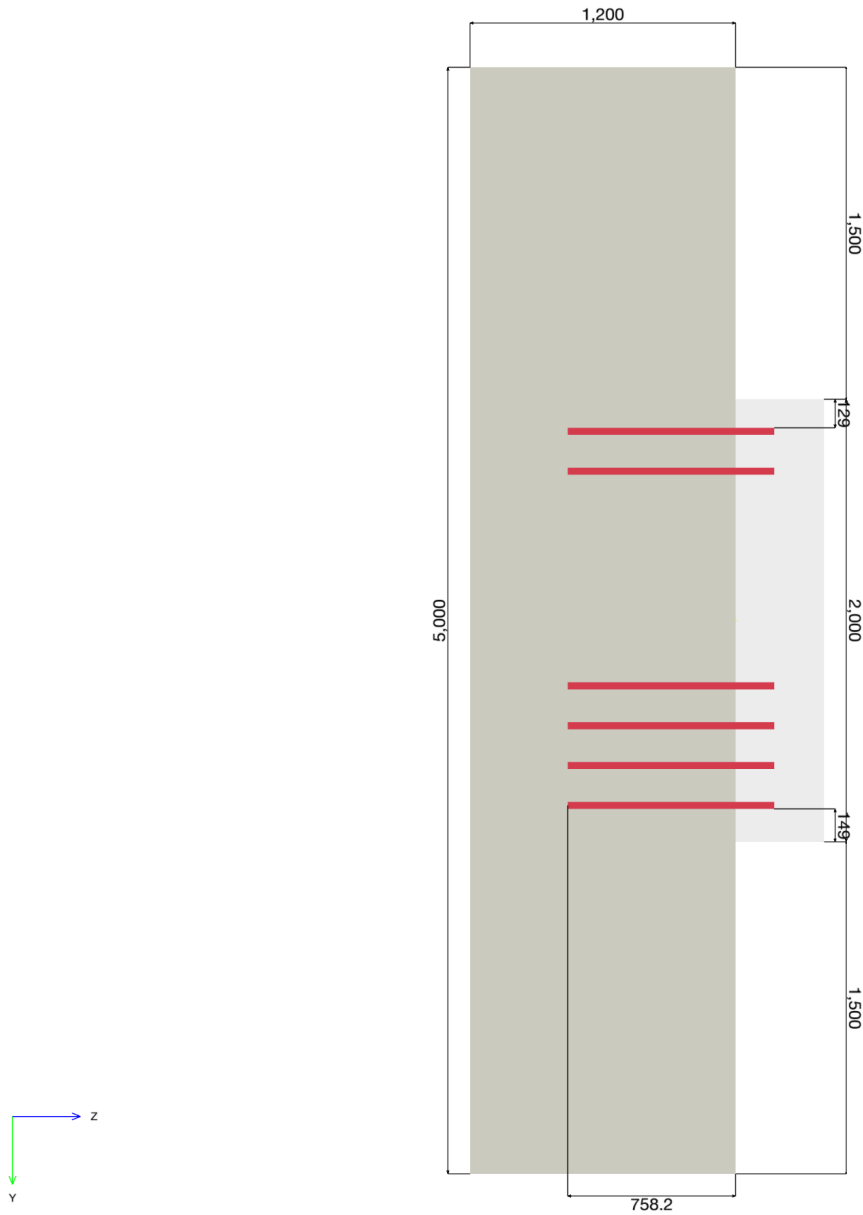
## 1.1. Geometry & Loading

Geometrical dimensions in [mm]. Loading values in [kN, kNm]





### 1.3. Side section view



Company:		Page:	6
Address:		Specifier:	
Phone   Fax:		E-mail:	
Design:	C2000-01 10H32@180	Date:	10. 01. 2024
Rebar application:			

## 2. Loads

### 2.1. Load combination and Geometry

LC	Load type	V <sub>y</sub> [kN]	N [kN]	M <sub>x</sub> [kNm]	Design Method	Max drill length l <sub>v</sub> [mm]	Max. Utilization [%]
	<u>Tension Bars due to Normal Shear</u>	<u>5,300.000</u>	<u>0.000</u>	<u>0.000</u>	<u>EN1992-1-1</u>	<u>758.219</u>	<u>106</u>
	Tension Bars due to Reversed Shear	-2,500.000	0.000	0.000	EN1992-1-1	758.219	100
	Interface Shear - Normal Shear (select the interface design check)	3,400.000	0.000	0.000	EN1992-1-1	758.219	100
	Interface Shear - Reversed Shear (select the interface design check)	-600.000	0.000	0.000	EN1992-1-1	320.000	54

Company:		Page:	7
Address:		Specifier:	
Phone   Fax:		E-mail:	
Design:	C2000-01 10H32@180	Date:	10. 01. 2024
Rebar application:			

### 3. Overview of results

#### 3.1. References

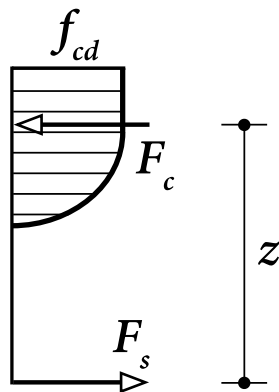
[1] EN 1992-1-1:2011 (01/2011): Eurocode 2: Design of concrete structures - Part 1-1: General rules and rules for buildings

#### 3.2. Cross-section verification

Description	Variable	Value
Post-Installed Rebar diameter	$\phi$	32 mm
Reinforcement yield strength, post installed	$f_{yk}$	500.00 N/mm <sup>2</sup>
Concrete compressive strength, existing	$f_{ck}$	40.00 N/mm <sup>2</sup>
Concrete compressive strength, new	$f_{ck}$	40.00 N/mm <sup>2</sup>
Member height	$h$	2,000 mm
Member width	$b$	850 mm

The determination of the load bearing capacity of the reinforced concrete member is performed assuming the Bernoulli Hypothesis ("plane sections remain plane").

For the (compressed) concrete the following stress-strain relationship (parabola-rectangle diagram) is used.



$$\sigma_c = f_{cd} \cdot \left[ 1 - \left( 1 - \frac{\epsilon_c}{\epsilon_{c2}} \right)^n \right] \text{ for } 0 \leq \epsilon_c \leq \epsilon_{c2} \quad [1] \text{ Eq. (3.17)}$$

$$\sigma_c = f_{cd} \text{ for } \epsilon_{c2} \leq \epsilon_c \leq \epsilon_{cu2} \quad [1] \text{ Eq. (3.18)}$$

$$f_{cd} = \frac{\alpha_{cc} \cdot f_{ck}}{\gamma_c} \quad [1] (3.15)$$

The design stress-strain diagram for reinforcing steel (in tension and compression) is assumed to be bi-linear with a horizontal top branch.

$f_{yd}$	$= \frac{f_{yk}}{\gamma_s}$	design yield stress
$\epsilon_{yd}$	$= \frac{f_{yd}}{E_s}$	design strain at yielding of steel reinforcement
$\epsilon_{ud}$		design ultimate strain for steel reinforcement

$f_{ck}$ [N/mm <sup>2</sup> ]	$\alpha_{cc}$ [-]	$\gamma_c$ [-]	$f_{cd}$ [N/mm <sup>2</sup> ]	$\epsilon_{c2}$ [-]	$\epsilon_{cu2}$ [-]
40.00	0.850	1.500	22.67	0.002	0.0035

$f_{yk}$ [N/mm <sup>2</sup> ]	$\gamma_s$ [-]	$f_{yd}$ [N/mm <sup>2</sup> ]	$E_s$ [N/mm <sup>2</sup> ]	$\epsilon_{yd}$ [-]	$\epsilon_{ud}$ [-]
500.00	1.150	434.78	200,000.00	0.002	0.020

Input data and results must be checked for conformity with the existing conditions and for plausibility!

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Company:		Page:	8
Address:		Specifier:	
Phone   Fax:		E-mail:	
Design:	C2000-01 10H32@180	Date:	10.01.2024
Rebar application:			

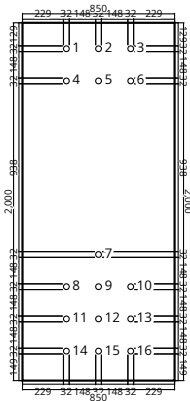
**Additional tension force due to shear load**

$$\Delta F_{td} = F_{Ed} = |V_{Ed}| \cdot \frac{a_l}{z} \quad [1] \text{ Eq. 9.3 and Section 9.2.1.3 (2)}$$

$$a_l = \frac{z \cdot (\cot \Theta - \cot \alpha)}{2} \quad [1] \text{ Eq. 9.2}$$

$V_{Ed}$ [kN]	$\Theta$ [°]	$\cot \Theta$ [-]	$\alpha$ [°]	$\cot \alpha$ [-]	$z$ [mm]
-5,300.000	42.5	1.091	90.0	0.000	1,457
$a_l$ [mm]	$\frac{a_l}{z}$ [-]		$\Delta F_{td}$ [kN]		
795	0.546		2,891.968		

Rebar arrangement and diameter at the interface; see figure below



**Resulting rebar forces**

Force (+Tension, -Compression)

Rebar	Tension Force [kN]	Additional tension force due to shear load ( $\Delta F_{td}$ ) [kN]	Total Force [kN]
1	-	-	-
2	-	-	-
3	-	-	-
4	-	-	-
5	-	-	-
6	-	-	-
7	-	289.197	289.197
8	-	289.197	289.197
9	-	289.197	289.197
10	-	289.197	289.197
11	-	289.197	289.197
12	-	289.197	289.197
13	-	289.197	289.197
14	-	289.197	289.197



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Company:		Page:	9
Address:		Specifier:	
Phone   Fax:		E-mail:	
Design:	C2000-01 10H32@180	Date:	10.01.2024
Rebar application:			

---

15	-	289.197	289.197
16	-	289.197	289.197

max. concrete compressive strain:	0.000 ‰
max. concrete compressive stress:	0.00 N/mm <sup>2</sup>
resulting tension force in (x/y) = (0.000/0.000):	0.000 kN
resulting compression force in (x/y) = (0.000/0.000):	0.000 kN
inner lever arm z =	- mm

Company:		Page:	10
Address:		Specifier:	
Phone   Fax:		E-mail:	
Design:	C2000-01 10H32@180	Date:	10. 01. 2024
Rebar application:			

## 4. Rebar design in tension ([1] Section 8.4 , 8.7 )

### 4.1. Steel verification and anchorage length determination

#### Input

Description	Variable	Value
Characteristic concrete compressive strength, existing	$f_{ck}$	40.00 N/mm <sup>2</sup>
Characteristic concrete tensile strength (5%-fractile), existing	$f_{ctk;0.05}$	2.456 N/mm <sup>2</sup>
Partial material safety factor	$\gamma_c$	1.500
Coefficient for long-term effects on the tensile strength	$\alpha_{ct}$	1.000
Design concrete tensile strength, existing	$f_{ctd}$	1.637 N/mm <sup>2</sup>
Rebar diameter, Post-installed	$\phi$	32.000 mm
Reinforcement yield strength	$f_{yk}$	500.000 N/mm <sup>2</sup>
Partial material safety factor	$\gamma_s$	1.150
Shape of rebar influence ([1] Table 8.2)	$\alpha_1$	1.000
Concrete cover influence ([1] Table 8.2)	$\alpha_2$	0.803
<b>Transverse pressure influence ([1] Table 8.2)</b>		
Transverse pressure	$p$	0.00 N/mm <sup>2</sup>
	$\alpha_5$	1.000

#### Governing loading situation

The results presented in the following are valid for the governing loading situation:

The shear verification acc. to [1] section 6.2.5 requires yielding of the rebars

#### Installation/Drill length results

$$l_v \geq l_{bd}$$

Rebar	$\phi$ [mm]	$l_{bd}$ [mm]	$l_v$ [mm]
1*	32	758	758
2*	32	758	758
3*	32	758	758
4*	32	758	758
5*	32	758	758
6*	32	758	758
7*	32	758	758
8*	32	758	758
9*	32	758	758
10*	32	758	758
11*	32	758	758
12*	32	758	758
13*	32	758	758
14*	32	758	758
15*	32	758	758
16*	32	758	758

\* rebars are anchored for yielding acc. to [1] Section 6.2.5;  $l_v = l_{bd}$

Input data and results must be checked for conformity with the existing conditions and for plausibility!

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## Steel verification

$$F_{Ed} \leq F_{yd} = \frac{A_s \cdot f_{yk}}{\gamma_s}$$

Rebar	$F_{Ed}$ [kN]	$\phi$ [mm]	$\gamma_s$ [-]	$A_s$ [mm <sup>2</sup> ]	$F_{yd}$ [kN]	Utilisation [%]	Status
Post-Installed 1	349.673	32	1.150	804	349.673	100	Ok
Post-Installed 2	349.673	32	1.150	804	349.673	100	Ok
Post-Installed 3	349.673	32	1.150	804	349.673	100	Ok
Post-Installed 4	349.673	32	1.150	804	349.673	100	Ok
Post-Installed 5	349.673	32	1.150	804	349.673	100	Ok
Post-Installed 6	349.673	32	1.150	804	349.673	100	Ok
Post-Installed 7	349.673	32	1.150	804	349.673	100	Ok
Post-Installed 8	349.673	32	1.150	804	349.673	100	Ok
Post-Installed 9	349.673	32	1.150	804	349.673	100	Ok
Post-Installed 10	349.673	32	1.150	804	349.673	100	Ok
Post-Installed 11	349.673	32	1.150	804	349.673	100	Ok
Post-Installed 12	349.673	32	1.150	804	349.673	100	Ok
Post-Installed 13	349.673	32	1.150	804	349.673	100	Ok
Post-Installed 14	349.673	32	1.150	804	349.673	100	Ok
Post-Installed 15	349.673	32	1.150	804	349.673	100	Ok
Post-Installed 16	349.673	32	1.150	804	349.673	100	Ok

## Anchorage length

$$l_{bd} = \alpha_1 \cdot \alpha_2 \cdot \alpha_3 \cdot \alpha_4 \cdot \alpha_5 \cdot l_{b,rqd} \geq l_{b,min} \quad [1] \text{ Eq. (8.4)}$$

$$l_{b,rqd} = \frac{\phi}{4} \cdot \frac{\sigma_{sd}}{f_{bd}} \quad [1] \text{ Eq. (8.3)}$$

$$l_{b,min} = \max(0.3 \cdot l_{b,rqd}, 10 \cdot \phi, 100\text{mm}) \quad [1] \text{ Eq. (8.6)}$$

$$\sigma_{sd} = \frac{F_{Ed}}{A_s}$$

$$f_{bd} = 2.25 \cdot \eta_1 \cdot \eta_2 \cdot f_{ctd} \quad [1] \text{ Eq. (8.2)}$$

$$\eta_1 = 1.0 \text{ for good bond conditions} \quad [1] \text{ Section 8.4.2 (2)}$$

$$\eta_1 = 0.7 \text{ for all other cases}$$

$$\eta_2 = 1.0 \text{ for rebars with } \phi \leq 32\text{mm} \quad [1] \text{ Section 8.4.2 (2)}$$

$$\eta_2 = \frac{(132-\phi)}{100} \text{ for rebars with } \phi > 32\text{mm}$$

$$f_{ctd} = \frac{\alpha_{ct} \cdot f_{ctk;0.05}}{\gamma_c} \quad [1] \text{ Eq. (3.16)}$$

$$f_{ctk;0.05} = 0.7 \cdot f_{ctm} = 0.7 \cdot 0.3 \cdot f_{ck}^{\frac{2}{3}} \quad [1] \text{ Table (3.1)}$$

## Post-installed rebars

In case of post-installed rebars, use  $f_{bd,PIR}$  in [1] Eq. (8.3)

$$f_{bd,PIR} = k_b \cdot f_{bd}$$

$$k_b \text{ bond efficiency factor from UKTA-0836-22/6577}$$

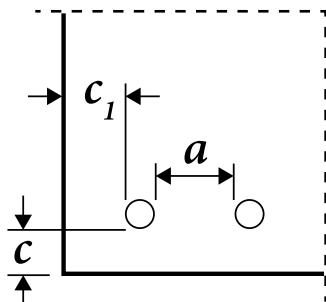
$$l_{0,min} = \alpha_{lb} \cdot l_{0,min}$$

$$\alpha_{lb} \text{ amplification factor from UKTA-0836-22/6577}$$

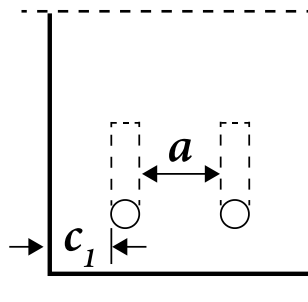
**Influencing factor ( $\alpha_i$ ) equations**

**Concrete cover**

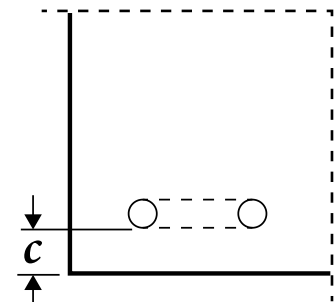
$$0.70 \leq \alpha_2 = 1 - 0.15 \cdot \frac{(c_d - \phi)}{\phi} \leq 1.00 \quad [1] \text{ Table 8.2}$$



Straight bars  
 $c_d = \min\left(\frac{a}{2}, c_1, c\right)$



Bent or hooked bars  
 $c_d = \min(c_1, c)$



Looped bars  
 $c_d = c$

**Transverse pressure**

$$0.7 \leq \alpha_5 = 1 - 0.04 \cdot p \leq 1.00 \quad [1] \text{ Table 8.2}$$

**Combination limit**

$$\alpha_{2,3,5} = \max(\alpha_2 \cdot \alpha_3 \cdot \alpha_5; 0.7) \quad [1] \text{ Eq. (8.5)}$$

Rebar	$F_{Ed}$ [kN]	$\phi$ [mm]	$A_s$ [mm <sup>2</sup> ]	$\sigma_{sd}$ [N/mm <sup>2</sup> ]	$\eta_1$ [-]	$\eta_2$ [-]	$f_{ctd}$ [N/mm <sup>2</sup> ]
Post-Installed 1	349.673	32	804	434.78	1.000	1.000	1.637
Post-Installed 2	349.673	32	804	434.78	1.000	1.000	1.637
Post-Installed 3	349.673	32	804	434.78	1.000	1.000	1.637
Post-Installed 4	349.673	32	804	434.78	1.000	1.000	1.637
Post-Installed 5	349.673	32	804	434.78	1.000	1.000	1.637
Post-Installed 6	349.673	32	804	434.78	1.000	1.000	1.637
Post-Installed 7	349.673	32	804	434.78	1.000	1.000	1.637
Post-Installed 8	349.673	32	804	434.78	1.000	1.000	1.637
Post-Installed 9	349.673	32	804	434.78	1.000	1.000	1.637
Post-Installed 10	349.673	32	804	434.78	1.000	1.000	1.637
Post-Installed 11	349.673	32	804	434.78	1.000	1.000	1.637
Post-Installed 12	349.673	32	804	434.78	1.000	1.000	1.637
Post-Installed 13	349.673	32	804	434.78	1.000	1.000	1.637
Post-Installed 14	349.673	32	804	434.78	1.000	1.000	1.637
Post-Installed 15	349.673	32	804	434.78	1.000	1.000	1.637
Post-Installed 16	349.673	32	804	434.78	1.000	1.000	1.637

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Rebar	$k_b$ [-]	$f_{bd}$ [N/mm <sup>2</sup> ]	$f_{bd,PIR}$ [N/mm <sup>2</sup> ]	$\alpha_{lb}$ [-]	$l_{b,rqd}$ [mm]	$l_{b,min}$ [mm]	$c_d$ [mm]
Post-Installed 1	1.000	3.68	3.68	1.000	944	320	74
Post-Installed 2	1.000	3.68	3.68	1.000	944	320	74
Post-Installed 3	1.000	3.68	3.68	1.000	944	320	74
Post-Installed 4	1.000	3.68	3.68	1.000	944	320	74
Post-Installed 5	1.000	3.68	3.68	1.000	944	320	74
Post-Installed 6	1.000	3.68	3.68	1.000	944	320	74
Post-Installed 7	1.000	3.68	3.68	1.000	944	320	74
Post-Installed 8	1.000	3.68	3.68	1.000	944	320	74
Post-Installed 9	1.000	3.68	3.68	1.000	944	320	74
Post-Installed 10	1.000	3.68	3.68	1.000	944	320	74
Post-Installed 11	1.000	3.68	3.68	1.000	944	320	74
Post-Installed 12	1.000	3.68	3.68	1.000	944	320	74
Post-Installed 13	1.000	3.68	3.68	1.000	944	320	74
Post-Installed 14	1.000	3.68	3.68	1.000	944	320	74
Post-Installed 15	1.000	3.68	3.68	1.000	944	320	74
Post-Installed 16	1.000	3.68	3.68	1.000	944	320	74

Rebar	$\alpha_1$ [-]	$\alpha_2$ [-]	$\alpha_3$ [-]
Post-Installed 1	1.000	0.803	1.000
Post-Installed 2	1.000	0.803	1.000
Post-Installed 3	1.000	0.803	1.000
Post-Installed 4	1.000	0.803	1.000
Post-Installed 5	1.000	0.803	1.000
Post-Installed 6	1.000	0.803	1.000
Post-Installed 7	1.000	0.803	1.000
Post-Installed 8	1.000	0.803	1.000
Post-Installed 9	1.000	0.803	1.000
Post-Installed 10	1.000	0.803	1.000
Post-Installed 11	1.000	0.803	1.000
Post-Installed 12	1.000	0.803	1.000
Post-Installed 13	1.000	0.803	1.000
Post-Installed 14	1.000	0.803	1.000
Post-Installed 15	1.000	0.803	1.000
Post-Installed 16	1.000	0.803	1.000

Rebar	$\alpha_4$ [-]	$p$ [N/mm <sup>2</sup> ]	$\alpha_5$ [-]	$\alpha_{2,3,5}$ [-]	$l_{bd}$ [mm]
Post-Installed 1	1.000	0.00	1.000	0.803	758
Post-Installed 2	1.000	0.00	1.000	0.803	758
Post-Installed 3	1.000	0.00	1.000	0.803	758
Post-Installed 4	1.000	0.00	1.000	0.803	758
Post-Installed 5	1.000	0.00	1.000	0.803	758
Post-Installed 6	1.000	0.00	1.000	0.803	758
Post-Installed 7	1.000	0.00	1.000	0.803	758
Post-Installed 8	1.000	0.00	1.000	0.803	758
Post-Installed 9	1.000	0.00	1.000	0.803	758
Post-Installed 10	1.000	0.00	1.000	0.803	758
Post-Installed 11	1.000	0.00	1.000	0.803	758
Post-Installed 12	1.000	0.00	1.000	0.803	758
Post-Installed 13	1.000	0.00	1.000	0.803	758

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---

Company:		Page:	14
Address:		Specifier:	
Phone   Fax:		E-mail:	
Design:	C2000-01 10H32@180	Date:	10.01.2024
Rebar application:			

---

Post-Installed 14	1.000	0.00	1.000	0.803	758
Post-Installed 15	1.000	0.00	1.000	0.803	758
Post-Installed 16	1.000	0.00	1.000	0.803	758

Company:		Page:	15
Address:		Specifier:	
Phone   Fax:		E-mail:	
Design:	C2000-01 10H32@180	Date:	10. 01. 2024
Rebar application:			

## 4.2. Shear at the interface between concrete cast at different times ([1] Section 6.2.5)

### Input

Description	Variable	Value
Cross-section shape	rectangular	
Member height	$h$	2,000 mm
Member width	$b$	850 mm
Compression zone area (cross-section analysis)	$A_{c,comp.}$	1,700,000 mm <sup>2</sup>
Resulting compression force (cross-section analysis)	$F_{Ed,comp.}$	0.000 kN
Concrete compressive strength, existing	$f_{ck}$	40.00 N/mm <sup>2</sup>
Concrete compressive strength, new	$f_{ck}$	40.00 N/mm <sup>2</sup>
Partial material safety factor	$\gamma_c$	1.500
Coefficient for long-term effects on the compressive strength	$\alpha_{cc}$	0.850
Coefficient for long-term effects on the tensile strength	$\alpha_{ct}$	1.000
Design concrete compressive strength	$f_{cd}$	22.67 N/mm <sup>2</sup>
Design concrete tensile strength	$f_{ctd}$	1.64 N/mm <sup>2</sup>
Reinforcement yield strength	$f_{yk}$	500.00 N/mm <sup>2</sup>
Partial material safety factor	$\gamma_s$	1.150
Inclination of shear reinforcement	$\alpha$	90.0 °
Surface roughness		rough, $c = 0.400$ , $\mu = 0.700$

### Verification

$$\nu_{Edi} \leq \nu_{Rdi} \quad [1] \text{ Eq. (6.23)}$$

$$\nu_{Edi} = \frac{V_{Ed}}{A_{c,comp.}}$$

$$V_{Ed} = \sqrt{V_{Ed,x}^2 + V_{Ed,y}^2}$$

$$\nu_{Rdi} = c \cdot f_{ctd} + \mu \cdot \sigma_n + \rho \cdot f_{yd} \cdot (\mu \cdot \sin \alpha + \cos \alpha) \leq 0.5 \cdot \nu \cdot f_{cd} \quad [1] \text{ Eq. (6.25)}$$

since  $\alpha = 90^\circ$

$$\nu_{Rdi} = c \cdot f_{ctd} + \mu \cdot \sigma_n + \rho \cdot f_{yd} \cdot \mu \leq 0.5 \cdot \nu \cdot f_{cd}$$

$$f_{ctd} = \frac{\alpha_{ct} \cdot f_{ctk;0.05}}{\gamma_c} \quad [1] \text{ Eq. (6.16)}$$

$$f_{ctk;0.05} = 0.7 \cdot f_{ctm} = 0.7 \cdot 0.3 \cdot f_{ck}^{\frac{2}{3}} \quad [1] \text{ Table 3.1}$$

$$\sigma_n = \frac{F_{Ed,comp.}}{A_{c,comp.}} \leq 0.6 \cdot f_{cd} \quad [1] \text{ Section 6.2.5 (1)}$$

$$\rho = \frac{A_s}{A_{c,comp.}} \quad [1] \text{ Section 6.2.5 (1)}$$

$$\nu = 0.6 \cdot \left(1 - \frac{f_{ck}}{250}\right) \quad [1] \text{ Eq. (6.6N)}$$

$$f_{cd} = \frac{\alpha_{cc} \cdot f_{ck}}{\gamma_c} \quad [1] \text{ Eq. (3.15)}$$

$c$ [-]	$f_{ctd}$ [N/mm <sup>2</sup> ]	$\mu$ [-]	$F_{Ed,comp.}$ [kN]	$A_{c,comp.}$ [mm <sup>2</sup> ]	$\sigma_n$ [N/mm <sup>2</sup> ]	$A_s$ [mm <sup>2</sup> ]
0.400	1.64	0.700	0.000	1,700,000	0.00	12,868
$\rho$ [-]	$f_{yd}$ [N/mm <sup>2</sup> ]	$\nu$ [-]	$f_{cd}$ [N/mm <sup>2</sup> ]	$\nu_{Rdi,Limit}$ [N/mm <sup>2</sup> ]	$V_{Ed,x}$ [kN]	$V_{Ed,y}$ [kN]
0.008	434.78	0.504	22.67	5.71	-0.000	-5,300.000

Input data and results must be checked for conformity with the existing conditions and for plausibility!

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Company:		Page:	16
Address:		Specifier:	
Phone   Fax:		E-mail:	
Design:	C2000-01 10H32@180	Date:	10.01.2024
Rebar application:			

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$V_{Ed}$ [kN]	$\nu_{Edi}$ [N/mm <sup>2</sup> ]	$\nu_{Rdi}$ [N/mm <sup>2</sup> ]	Utilisation [%]	Status
5,300.000	3.12	2.96	106	Not Ok

The following rebars have to be anchored/spliced for yielding:

Layer contains rebars 1-16

## 5. Warnings

This design exclusively considers the load transfer with post-installed rebars at the interface between new and existing concrete.

Load distribution to the rebars is done assuming that cross-sections remain plane after bending.

Shear load carrying capacity of the cross section must be designed separately.

The joint surfaces for concreting must be roughened at least to such an extent that aggregates protrude.

The accessory list in this report is for the information of the user only. All the relevant installation conditions (drilling, cleaning, setting) must be done in accordance with the relevant UKTA and product IFUs.

The check for maximum allowed spacing between post-installed rebars is not being performed due to their irregular placement.

It is the user's responsibility to provide sufficient shear reinforcement and resistance  $V_{rd,s}$  in accordance to EN 1992-1-1:2004 par. 6.2.3.

The verification of the interface shear for connections that carry gravity loads directly through the joint requires engineering judgment. Consideration should be given to the potential for relaxation of the anchorage and its potential effect on shear transfer across the interface. This is especially true for cantilever elements.

If the design is carried out assuming a simply supported connection a check for partial fixity may be required, acc. to EN1992-1-1.

## **Interface does not meet the design criteria!**

Company:  
Address:  
Phone | Fax: |  
Design: C2000-01 10H32@180  
Rebar application:

Page: 18  
Specifier:  
E-mail:  
Date: 10.01.2024

## 6. Installation data

Mortar: HIT-RE 500 V4 + Rebar

Item number: 2287557 HIT-RE 500 V4 (adhesive)

Reinforcement yield strength  $f_{yk}$ : 500.00 N/mm<sup>2</sup>

Drilling method: Hammer drilling (HD) (Drilling aid is used)

Hole type: Dry Concrete

Installation temperature: from 5°C to 20°C

Roughness: Rough

Hole cleaning: Per ETA

Post-installed rebars

	Diameter	Coordinate X	Coordinate Y	$f_{yk}$	Drilling length, $l_v$	Drilling diameter, $d_0$
1	32mm	-180 mm	855 mm	500.00 N/mm <sup>2</sup>	758 mm	40 mm
2	32mm	0 mm	855 mm	500.00 N/mm <sup>2</sup>	758 mm	40 mm
3	32mm	180 mm	855 mm	500.00 N/mm <sup>2</sup>	758 mm	40 mm
4	32mm	-180 mm	675 mm	500.00 N/mm <sup>2</sup>	758 mm	40 mm
5	32mm	0 mm	675 mm	500.00 N/mm <sup>2</sup>	758 mm	40 mm
6	32mm	180 mm	675 mm	500.00 N/mm <sup>2</sup>	758 mm	40 mm
7	32mm	0 mm	-295 mm	500.00 N/mm <sup>2</sup>	758 mm	40 mm
8	32mm	-180 mm	-475 mm	500.00 N/mm <sup>2</sup>	758 mm	40 mm
9	32mm	0 mm	-475 mm	500.00 N/mm <sup>2</sup>	758 mm	40 mm
10	32mm	180 mm	-475 mm	500.00 N/mm <sup>2</sup>	758 mm	40 mm
11	32mm	-180 mm	-655 mm	500.00 N/mm <sup>2</sup>	758 mm	40 mm
12	32mm	0 mm	-655 mm	500.00 N/mm <sup>2</sup>	758 mm	40 mm
13	32mm	180 mm	-655 mm	500.00 N/mm <sup>2</sup>	758 mm	40 mm
14	32mm	-180 mm	-835 mm	500.00 N/mm <sup>2</sup>	758 mm	40 mm
15	32mm	0 mm	-835 mm	500.00 N/mm <sup>2</sup>	758 mm	40 mm
16	32mm	180 mm	-835 mm	500.00 N/mm <sup>2</sup>	758 mm	40 mm

## 6.1. Working time and curing time <sup>1) 2)</sup>

Temperature in the base material T	Maximum working time $t_{work}$	Initial curing time $t_{cure,ini}$	Minimum curing time $t_{cure}$
-5 °C to -1 °C	2 hours	2 days	7 days
0 °C to 4 °C	2 hours	1 days	2 days
5 °C to 9 °C	2 hours	16 hours	1 days
10 °C to 14 °C	1.5 hours	12 hours	16 hours
15 °C to 19 °C	1 hours	8 hours	16 hours
20 °C to 24 °C	30 min	4 hours	7 hours
25 °C to 29 °C	20 min	3.5 hours	6 hours
30 °C to 34 °C	15 min	3 hours	5 hours
35 °C to 39 °C	12 min	2 hours	4.5 hours
40 °C	10 min	2 hours	4 hours

1) The curing time data are valid for dry base material only. In wet base material the curing times must be doubled.

2) The minimum temperature of the foil pack is +5°C.

Company:		Page:	20
Address:		Specifier:	
Phone   Fax:		E-mail:	
Design:	C2000-01 10H32@180	Date:	10. 01. 2024
Rebar application:			

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## 7. Remarks; Your cooperation duties

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