REMT UTAMA SDN BHD 409864-W

Engineering And Contracting

Ground Floor, Lot 20
Grace Square, Jln Pantai Sembulan,
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88100 Kota Kinabalu, Sabah.
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E-mail: remt.utama.sb@gmail.com

Date : *22th January 2020*
Our Ref : *RUSB/AD.C-AKT (BOMBA.BFORT) (las)/1.1.2/20-007*

Aktif FA Consult SdnBhd
Lot 17 & 19, 2nd Floor,
Block C, Damai Plaza, Phase 4,
Jalan Damai, Luyang
88859 Kota Kinabalu,
Sabah.
Attention : Ir. Mohd Arzahri

Dear Sir,

CADANGAN PEMBINAAN PROJEK BALAI BOMBA DAN PENYELAMAT BEAUFORT, SABAH
NO KONTRAK : KPKT/CPPP/JBPM/14/15/2019
- Sample submission Form – Concrete Mix Design

Reference is made to the above matter.

We enclosed herewith three (3) sets of our SSF no. RUSB/BOMBA/SSF/002 dated 22/01/20 for concrete mix design for your reference and approval.

We trust the above submission is in order, should you require further clarification please do not hesitate to contact the undersign.

Thank you.

REMT UTAMA SDN BHD
(Syarikat berdaftar TERAJU – Program TeraS)

SHIR ZAMAN BIN FAZUL RAHMAN
GENERAL MANAGER

SAMPLE SUBMISSION FORM

REF. NO. : RUSB/BOMBA/SSF/002

CADANGAN PEMBINAAN PROJEK BALAI BOMBA DAN PENYELAMAT BEAUFORT, SABAH

TO : IR. MOHD ARZAHRI - AKTIF FA CONSULT SDN BHD

FROM : SULASTRI - REMT UTAMA SDN BHD

DATE : 22 JANUARY 2020

MATERIAL : CONCRETE DESIGN MIX

	DESCRIPTION	COMPANY/BRAND	MODEL/TECHNICAL
1	Concrete Mix Design	Kotamix Concrete Sdn Bhd	- Gred 15 Normal mix
			- Gred 25 Normal mix
			- Gred 25 Pump mix
			- Gred 30 Normal mix
			- Gred 30 Pump mix

SIGNATURE :

COMMENT : For your perusal and approval.

APPROVED/RESUBMIT :

SIGNATURE : DATE :

ATTACHMENTS : [/] YES [ ] NO

DISTRIBUTION : [ ] CLIENT [ ] ARCHITECT [/] C&S [ ] M&E

KOTAMIX CONCRETE SDN BHD

Concrete Mix Design for: REMT UTAMA SDN BHD | **Date:** 22-Jan-20
Project : CADANGAN PEMBINAAN PROJEK BALAI BOMBA DAN PENYELAMAT | **Mix Code:** C15N
Mix Class: Designed Mix
Workability: 100+/-25 mm

Item	Description	Remark	Symbol	Value
1.1	Characteristic Strength	Specified at 28 days	Sc	15 Mpa
		proportion defective		5 %
1.2	Standard deviation(%)	data/no data	s	3.5 Mpa
			k	1.64
1.3	Margin	d=sxk	d	5.7 Mpa
1.4	Target mean strength (Mpa)	St=Sc + d	St	20.7 Mpa
1.5	Free water/cement ratio		wc	0.74
2.1	Cement type	specified		OPC
2.2	Aggregate : Fine	Crushed/uncrushed		Uncrushed
	Aggregate : Coarse	Crushed/uncrushed	20mm	Crushed Single/graded
2.3	Admixture Type I	Dosage (per 100kg cement)	RS233	600 ml
	Type II	Dosage (per 100kg cement)	RF610	0 ml
2.4	Density of cement (kg/m3)	Cement I OPC	dc1	3.15 kg/m3
		Cement II	dc2	kg/m3
		Cement III	dc3	kg/m3
2.5	Density of Fine Aggregate	SSD	da	2600 kg/m3
2.6	Density of Coarse Aggregate	SSD	dca	2630 kg/m3
3.1	Maximum aggregate size	specified		20 mm
3.2	Grading of fine aggregate	B.S. 882	Zone	IV
3.3	Proportion of fine aggregate		ra	35 %
3.4	Proportion of coarse aggregate		rca	65 %
3.5	Density of combined aggregate	dc=da x ra + dca x rca	dc	2620 kg/m3
4.1	Workability : Slump	specified		100+/-25 mm
4.2	Air content	estimated 2%	Va	20 l/m3
4.3	Free water requirement	1kg=1 litre	Vw	170 l/m3
4.4	Cement content	mc=mw/wc	mc	230 kg/m3
	Cement I	mc=mco x % 100%	mc1	230 kg/m3
		Vc1 = mco/dc1 x %	Vc1	73 l/m3
	Cement II	Mc2=mco x % 0%	mc2	kg/m3
		Vc2=mco/dc2 x %	Vc2	l/m3
	Cement III	Mc3=mco x % 0%	mc3	kg/m3
		Vc3=mco/dc3 x %	Vc3	l/m3
	Total cement volume	Vc=Vc1 + Vc2 + Vc3		73 l/m3
4.5	Modified free water/cement ratio			
4.6	Total aggregate content	Vfc=1000 - Va - Vc - Vw	Vc	737 l/m3
		mfc = Vfc x dca	mfc	1931 kg
4.7	Fine aggregate	=mfc x ra		676 kg
4.8	Coarse aggregate	=mfc x rca		1255 kg
5.1	Designed density of concrete	=mw + mc + mfc		2331 kg/m3

6.1 **Summary**

Cement (kg/m3) OPC	230	
Water/cement ratio	0.74	
Fine Aggregate (kg/m3)	676	
Total Coarse Aggregate (kg/m3)	1255	
- 20mm	1255	
-10mm	0	
Water (kg/m3)	170	
Admixture (litre/m3)	1.38 (RS233)	0 (RF610)
Slump (mm)	75mm - 125mm	

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KOTAMIX CONCRETE SDN BHD

Concrete Mix Design for: REMT UTAMA SDN BHD
Project : CADANGAN PEMBINAAN PROJEK BALAI BOMBA DAN PENYELAMAT

Date: 22-Jan-20
Mix Code: C25N
Mix Class: Designed Mix
Workability: 100+/-25 mm

Item	Description	Remark	Symbol	Value
1.1	Characteristic Strength	Specified at 28 days	S_c	25 Mpa
		proportion defective		5 %
1.2	Standard deviation(%)	data/no data	s	4.0 Mpa
			k	1.64
1.3	Margin	d=sxk	d	6.6 Mpa
1.4	Target mean strength (Mpa)	$S_t = S_c + d$	S_t	31.6 Mpa
1.5	Free water/cement ratio		wc	0.50
2.1	Cement type	specified		OPC
2.2	Aggregate : Fine	Crushed/uncrushed		Uncrushed
	Aggregate : Coarse	Crushed/uncrushed	20mm	Crushed Single/graded
2.3	Admixture Type I	Dosage (per 100kg cement)	RS233	800 ml
	Type II	Dosage (per 100kg cement)	RF610	400 ml
2.4	Density of cement (kg/m3)	Cement I OPC	d_{c1}	3.15 kg/m3
		Cement II	d_{c2}	kg/m3
		Cement III	d_{c3}	kg/m3
2.5	Density of Fine Aggregate	SSD	d_a	2600 kg/m3
2.6	Density of Coarse Aggregate	SSD	d_{ca}	2630 kg/m3
3.1	Maximum aggregate size	specified		20 mm
3.2	Grading of fine aggregate	B.S. 882	Zone	IV
3.3	Proportion of fine aggregate		r_a	34 %
3.4	Proportion of coarse aggregate		r_{ca}	66 %
3.5	Density of combined aggregate	$d_c = d_a \times r_a + d_{ca} \times r_{ca}$	d_c	2620 kg/m3
4.1	Workability : Slump	specified		100+/-25 mm
4.2	Air content	estimated 2%	V_a	20 l/m3
4.3	Free water requirement	1kg=1 litre	V_w	170 l/m3
4.4	Cement content	$m_c = m_w/w_c$	m_c	340 kg/m3
	Cement I	$m_c = m_{co} \times \%$ 100%	m_{c1}	340 kg/m3
		$V_{c1} = m_{co}/d_{c1} \times \%$	V_{c1}	108 l/m3
	Cement II	$M_{c2} = m_{co} \times \%$ 0%	m_{c2}	kg/m3
		$V_{c2} = m_{co}/d_{c2} \times \%$	V_{c2}	l/m3
	Cement III	$M_{c3} = m_{co} \times \%$ 0%	m_{c3}	kg/m3
		Vc3=mco/dc3 x %	V_{c3}	l/m3
	Total cement volume	$V_c = V_{c1} + V_{c2} + V_{c3}$		108 l/m3
4.5	Modified free water/cement ratio			
4.6	Total aggregate content	$V_{fc} = 1000 - V_a - V_c - V_w$	V_{tc}	702 l/m3
		$m_{tc} = V_{tc} \times d_c$	m_{tc}	1839 kg
4.7	Fine aggregate	$= m_{tc} \times r_a$		625 kg
4.8	Coarse aggregate	$= m_{tc} \times r_{ca}$		1214 kg
5.1	Designed density of concrete	$= m_w + m_c + m_{tc}$		2349 kg/m3

6.1 **Summary**

Cement (kg/m3) OPC	340	
Water/cement ratio	0.50	
Fine Aggregate (kg/m3)	625	
Total Coarse Aggregate (kg/m3)	1214	
- 20mm	1214	
-10mm	0	
Water (kg/m3)	170	
Admixture (litre/m3)	2.72 (RS233)	1.36 (RF610)
Slump (mm)	75mm - 125mm	

Scanned with CamScanner

KOTAMIX CONCRETE SDN BHD

Concrete Mix Design for: REMT UTAMA SDN BHD
Project : CADANGAN PEMBINAAN PROJEK BALAI BOMBA DAN PENYELAMAT BEAUFORT, SABAH
0

Date: 22-Jan-20
Mix Code: C25P
Mix Class: Designed Mix
Workability: 125+/-25 mm

Item	Description	Remark	Symbol	Value
1.1	Characteristic Strength	Specified at 28 days	Sc	25 Mpa
		proportion defective		5 %
1.2	Standard deviation(%)	data/no data	s	4.0 Mpa
			k	1.64
1.3	Margin	d=sxk	d	6.6 Mpa
1.4	Target mean strength (Mpa)	$S_t = S_c + d$	S_t	31.6 Mpa
1.5	Free water/cement ratio		wc	0.47
2.1	Cement type	specified		OPC
2.2	Aggregate : Fine	Crushed/uncrushed		Uncrushed
	Aggregate : Coarse	Crushed/uncrushed	20mm	Crushed Single/graded
2.3	Admixture Type I	Dosage (per 100kg cement)	RS233	800 ml
	Type II	Dosage (per 100kg cement)	RF610	500 ml
2.4	Density of cement (kg/m3)	Cement I OPC	d_{c1}	3.15 kg/m3
		Cement II	d_{c2}	kg/m3
		Cement III	d_{c3}	kg/m3
2.5	Density of Fine Aggregate	SSD	d_{fa}	2600 kg/m3
2.6	Density of Coarse Aggregate	SSD	d_{ca}	2630 kg/m3
3.1	Maximum aggregate size	specified		20 mm
3.2	Grading of fine aggregate	B.S. 882	Zone	IV
3.3	Proportion of fine aggregate		r_{fa}	38 %
3.4	Proportion of coarse aggregate		r_{ca}	62 %
3.5	Density of combined aggregate	$d_c = d_{fa} \times r_{fa} + d_{ca} \times r_{ca}$	d_c	2619 kg/m3
4.1	Workability : Slump	specified		125+/-25 mm
4.2	Air content	estimated 2%	V_a	20 l/m3
4.3	Free water requirement	1kg=1 litre	V_w	165 l/m3
4.4	Cement content	$m_c = m_w/w_c$	m_c	350 kg/m3
	Cement I	$m_c = m_{co} \times$ % 100%	m_{c1}	350 kg/m3
		$V_{c1} = m_{co}/d_{c1} \times$ %	V_{c1}	111 l/m3
	Cement II	$M_{c2} = m_{co} \times$ % 0%	m_{c2}	kg/m3
		$V_{c2} = m_{co}/d_{c2} \times$ %	V_{c2}	l/m3
	Cement III	$M_{co} = m_{co} \times$ % 0%	m_{c3}	kg/m3
		Vc3=mco/dc3 x %	V_{c3}	l/m3
	Total cement volume	$V_c = V_{c1} + V_{c2} + V_{c3}$		111 l/m3
4.5	Modified free water/cement ratio			
4.6	Total aggregate content	$V_{fc} = 1000 - V_a - V_c - V_w$	V_{fc}	704 l/m3
		$m_{fc} = V_{fc} \times d_{fa}$	m_{fc}	1843 kg
4.7	Fine aggregate	$= m_{fc} \times r_{fa}$		700 kg
4.8	Coarse aggregate	$= m_{fc} \times r_{ca}$		1143 kg
5.1	Designed density of concrete	$= m_w + m_c + m_{fa}$		2358 kg/m3

6.1 **Summary**

Cement (kg/m3) OPC	350	
Water/cement ratio	0.47	
Fine Aggregate (kg/m3)	700	
Total Coarse Aggregate (kg/m3)	1143	
- 20mm	1143	
-10mm	0	
Water (kg/m3)	165	
Admixture (litre/m3)	2.8 (RS233)	1.75 (RF610)
Slump (mm)	100mm - 150mm	

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KOTAMIX CONCRETE SDN BHD

Concrete Mix Design for: REMT UTAMA SDN BHD — **Date:** 22-Jan-20

Project : CADANGAN PEMBINAAN PROJEK BALAI BOMBA DAN PENYELAMAT — **Mix Code:** C30N

Mix Class: Designed Mix

0 — **Workability:** 100+/-25 mm

Item	Description	Remark		Symbol	Value
1.1	Characteristic Strength	Specified at 28 days		S_c	30 Mpa
		proportion defective			5 %
1.2	Standard deviation(%)	data/no data		s	4.0 Mpa
				k	1.64
1.3	Margin	d=sxk		d	6.6 Mpa
1.4	Target mean strength (Mpa)	$S_m = S_c + d$		S_t	36.6 Mpa
1.5	Free water/cement ratio			wc	0.45
2.1	Cement type	specified			OPC
2.2	Aggregate : Fine	Crushed/uncrushed			Uncrushed
	Aggregate : Coarse	Crushed/uncrushed		20mm	Crushed Single/graded
2.3	Admixture Type I	Dosage (per 100kg cement)		RS233	800 ml
	Type II	Dosage (per 100kg cement)		RF610	500 ml
2.4	Density of cement (kg/m3)	Cement I	OPC	d_{c1}	3.15 kg/m3
		Cement II		d_{c2}	kg/m3
		Cement III		d_{c3}	kg/m3
2.5	Density of Fine Aggregate	SSD		d_{fa}	2600 kg/m3
2.6	Density of Coarse Aggregate	SSD		d_{ca}	2630 kg/m3
3.1	Maximum aggregate size	specified			20 mm
3.2	Grading of fine aggregate	B.S. 882		Zone	IV
3.3	Proportion of fine aggregate			r_{fa}	34 %
3.4	Proportion of coarse aggregate			r_{ca}	66 %
3.5	Density of combined aggregate	$d_c = d_{fa} \times r_{fa} + d_{ca} \times r_{ca}$		d_c	2620 kg/m3
4.1	Workability : Slump	specified			100+/-25 mm
4.2	Air content	estimated	2%	V_g	20 l/m3
4.3	Free water requirement	1kg=1 litre		V_w	170 l/m3
4.4	Cement content	$m_c = m_w / w_c$		m_c	380 kg/m3
	Cement I	$m_c = m_{co} \times \%$	100%	m_{c1}	380 kg/m3
		$V_{c1} = m_{co} / d_{c1} \times \%$		V_{c1}	121 l/m3
	Cement II	$M_{c2} = m_{co} \times \%$	0%	m_{c2}	kg/m3
		$V_{c2} = m_{co} / d_{c2} \times \%$		V_{c2}	l/m3
	Cement III	$M_{c3} = m_{co} \times \%$	0%	m_{c3}	kg/m3
		Vc3=mco/dc3 x %		V_{c3}	l/m3
	Total cement volume	$V_c = V_{c1} + V_{c2} + V_{c3}$			121 l/m3
4.5	Modified free water/cement ratio				
4.6	Total aggregate content	$V_{fc} = 1000 - V_g - V_c - V_w$		V_{fc}	689 l/m3
		$m_{fc} = V_{fc} \times d_c$		m_{fc}	1806 kg
4.7	Fine aggregate	$= m_{fc} \times r_{fa}$			614 kg
4.8	Coarse aggregate	$= m_{fc} \times r_{ca}$			1192 kg
5.1	Designed density of concrete	$= m_w + m_c + m_{fc}$			2356 kg/m3

6.1 **Summary**

Cement (kg/m3) OPC	380	
Water/cement ratio	0.45	
Fine Aggregate (kg/m3)	614	
Total Coarse Aggregate (kg/m3)	1192	
- 20mm	1192	
-10mm	0	
Water (kg/m3)	170	
Admixture (litre/m3)	3.04 (RS233)	1.9 (RF610)
Slump (mm)	75mm - 125mm	

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KOTAMIX CONCRETE SDN BHD

Concrete Mix Design for: REMT UTAMA SDN BHD
Project : CADANGAN PEMBINAAN PROJEK BALAI BOMBA DAN PENYELAMAT BEAUFORT, SABAH
0

Date: 22-Jan-20
Mix Code: C30P
Mix Class: Designed Mix
Workability: 125+/-25 mm

Item	Description	Remark	Symbol	Value
1.1	Characteristic Strength	Specified at 28 days	Sc	30 Mpa
		proportion defective		5 %
1.2	Standard deviation(%)	data/no data	s	4.0 Mpa
			k	1.64
1.3	Margin	d=sxk	d	6.6 Mpa
1.4	Target mean strength (Mpa)	S_m=S_c + d	S_t	36.6 Mpa
1.5	Free water/cement ratio		wc	0.42
2.1	Cement type	specified		OPC
2.2	Aggregate : Fine	Crushed/uncrushed		Uncrushed
	Aggregate : Coarse	Crushed/uncrushed	20mm	Crushed Single/graded
2.3	Admixture Type I	Dosage (per 100kg cement)	RS233	800 ml
	Type II	Dosage (per 100kg cement)	RF610	600 ml
2.4	Density of cement (kg/m3)	Cement I OPC	d_{c1}	3.15 kg/m3
		Cement II	d_{c2}	kg/m3
		Cement III	d_{c3}	kg/m3
2.5	Density of Fine Aggregate	SSD	d_a	2600 kg/m3
2.6	Density of Coarse Aggregate	SSD	d_{ca}	2630 kg/m3
3.1	Maximum aggregate size	specified		20 mm
3.2	Grading of fine aggregate	B.S. 882	Zone	IV
3.3	Proportion of fine aggregate		r_a	38 %
3.4	Proportion of coarse aggregate		r_{ca}	62 %
3.5	Density of combined aggregate	d_c=d_a x r_a + d_{ca} x r_{ca}	d_c	2619 kg/m3
4.1	Workability : Slump	specified		125+/-25 mm
4.2	Air content	estimated 2%	V_g	20 l/m3
4.3	Free water requirement	1kg=1 litre	V_w	165 l/m3
4.4	Cement content	m_c=m_w/wc	m_c	390 kg/m3
	Cement I	m_c=m_{co} x % 100%	m_{c1}	390 kg/m3
		V_{c1} = m_{co}/d_{c1} x %	V_{c1}	124 l/m3
	Cement II	M_{c2}=m_{co} x % 0%	m_{c2}	kg/m3
		V_{c2}=m_{co}/d_{c2} x %	V_{c2}	l/m3
	Cement III	M_{c3}=m_{co} x % 0%	m_{c3}	kg/m3
		Vc3=mco/dc3 x %	V_{c3}	l/m3
	Total cement volume	V_c=V_{c1} + V_{c2} + V_{c3}		124 l/m3
4.5	Modified free water/cement ratio			
4.6	Total aggregate content	Vfc=1000 - V_g - V_c - V_w	V_a	691 l/m3
		m_a = V_a x d_a	m_a	1810 kg
4.7	Fine aggregate	=m_a x r_a		688 kg
4.8	Coarse aggregate	=m_a x r_{ca}		1122 kg
5.1	Designed density of concrete	=m_c + m_a + m_w		2365 kg/m3

6.1 **Summary**

Cement (kg/m3) OPC	390	
Water/cement ratio	0.42	
Fine Aggregate (kg/m3)	688	
Total Coarse Aggregate (kg/m3)	1122	
- 20mm	1122	
-10mm	0	
Water (kg/m3)	165	
Admixture (litre/m3)	3.12 (RS233)	2.34 (RF610)
Slump (mm)	100mm - 150mm	

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