

SAMPLE CALCULATION REPORT

OPTIMO Panel Formwork System

Outer frame with Optimo profile and "CU" crossbeams welded every 30 cm, on which a single plywood panel is fixed with self-drilling screws. The panel is 18 mm-thick birch plywood with phenolic coating, 220/220 g/m².

CAUTION

Do not use cross beams as stairs.

PRESSURE

60 kN/m²: pressure of fresh concrete according to DIN 18218, respecting the flatness tolerance as per DIN 18202 (chart 3 line 7).

OPTIMO PROFILE

weight = 4.52 kg/m, material EN 1002B/S23B JR.

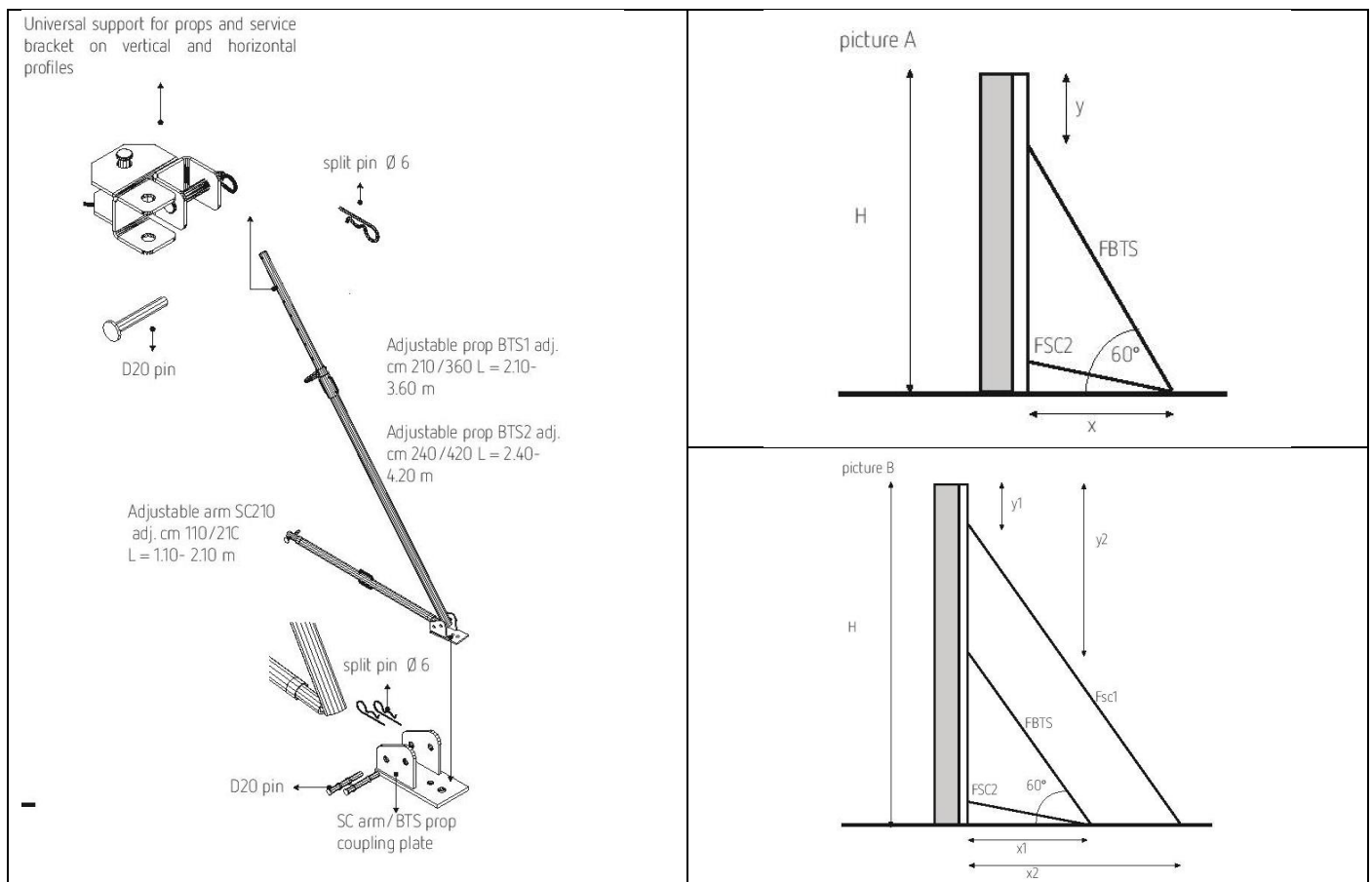
18 mm-thick single-panel Finnish plywood with 220/220 g/m² phenolic film.

The holes in the panel permit the insertion of DW15 tie rods, inclined at most 4.5°.

Considering a normal scaffold wood board, the safe distance between two casting brackets is 1.5 m.

PUSH-PULL PROPS *Refer User Manual (Sheet No. 22)*

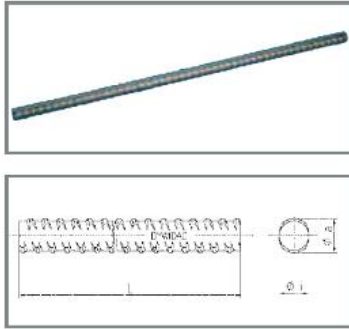
Condition when not operating wind load = 0.8 kN/m² (80 kg/m²)



	picture A			picture B		
Formwork height H [m]	3,00	3,75	4,50		6,00	9,00
Distance of maximum influence between props [m]	4,00	2,73	1,55		2,96	1,96
Normal stress FBTS max [kN]	12,52	9,15	5,62	FBTS	7,07	7,06
Normal stress FSC2 max [kN]	1,58	1,69	1,89	FSC2	4,85	11,70
x = distance between the support plate and the front edge of the formwork	1,30	1,59	2,02	x1	2,17	2,17
				x2	3,32	3,75
y = distance between the prop connection point and the top edge of the formwork	0,75	1,00	1,00	y1	0,25	2,50
				y2	2,25	5,25

Tie Rod Details

Considered Tie Rod: 15 F 0105



DYWIDAG Threadbar, not weldable

Article No.	Ø [mm]	Steel Grade	Max. Load [kN]	Working Load [kN]	Weight [kg/m]
15 F 0105	15/17	St 900/1100	195	90	1.44
20 F 0105	20/23	St 900/1100	345	160	2.56
26 WR 0100	26.5/30	St 950/1050	580	300	4.50

Hot rolled, subject to independent supervision according to German bar approval
Not weldable: Do not heat or weld the Threadbars, they may break.

All Threadbars also available galvanized > Article No. .../V
(example 15 F 0105/V)

Clamps Details (Refer User manual Sheet no.11)

Positioning of connecting elements, anchoring elements and accessories for:

1. Lifting and positioning
2. Handling using the crane
3. Loads on the walking platform
4. Pouring the concrete

FIXED CLAMP

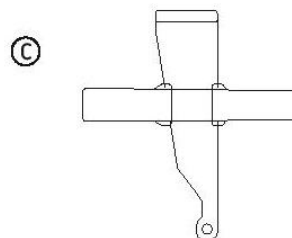
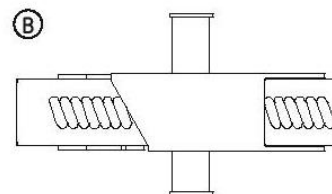
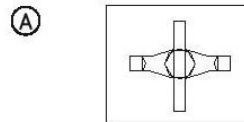
Tensile force allowed: 15.0 kN
Transverse strength allowed: 6.0 kN
Momentum allowed: 0.5 kNm

ADJUSTABLE CLAMP

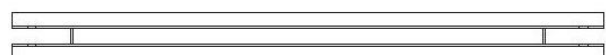
Tensile force allowed: 15.0 kN
Transverse strength allowed: 9.0 kN
Momentum allowed: 0.9 kNm
These values apply only in the case of a support on the profile.

ALIGNER

Momentum allowed (for added storey): 5.0 kNm



- (A) Tie rod and plate with wing nut
- (B) Adjustable clamp
- (C) Fixed clamp
- (D) Aligner



OPTIMO PANEL VERIFICATION

Design of a Column 3.75 m high by Optimo formwork panels. [Worst case considered for panels.]

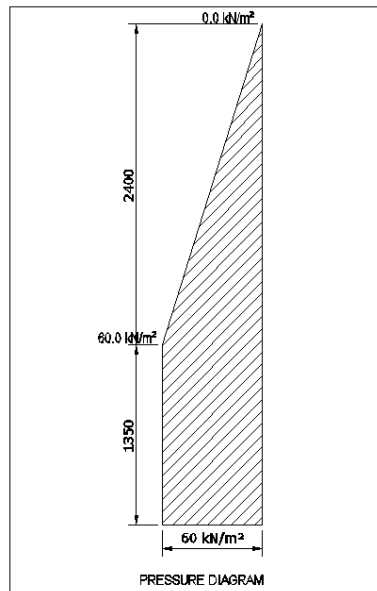
Technical and Geometric Characteristics

SYSTEM: Optimo formwork panels

Max Fresh Concrete Pressure Considered	=	60 kN/m ²
Panel Size (Worst Case Considered)	=	1.0m +1.0m
Maximum height	=	3.75 m
Tie Rod diameter	=	15 mm
Tie rod Admissible Traction Load (DIN 18216)	=	90Kn

Concrete Characteristics

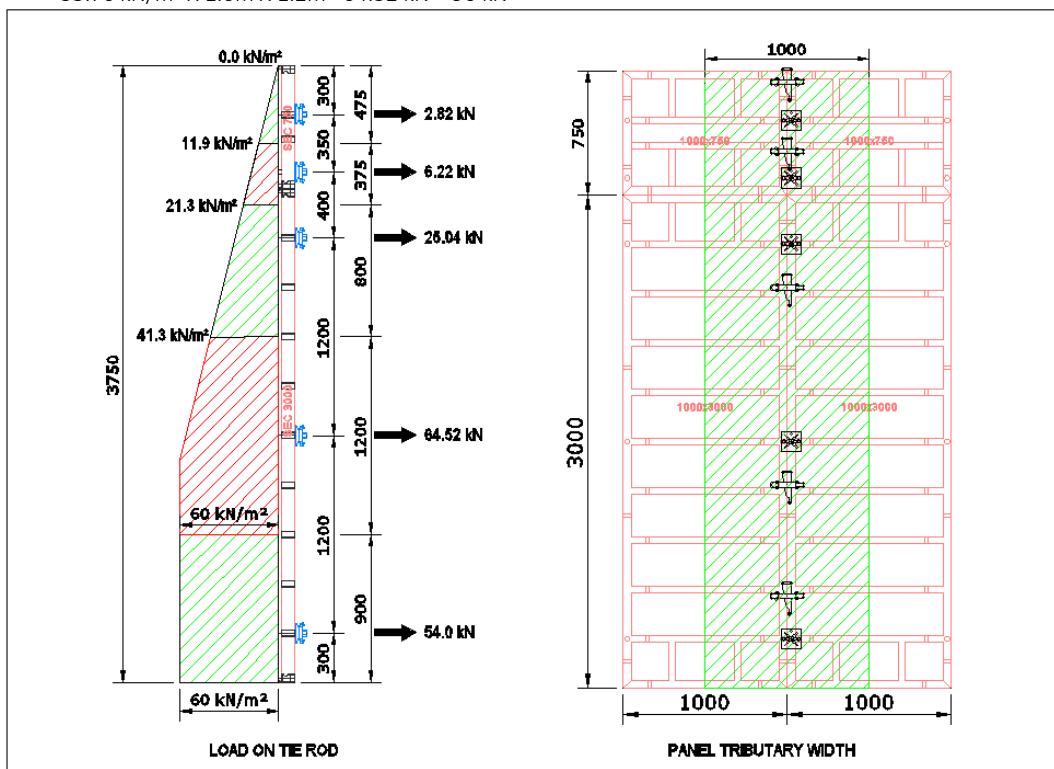
Density of concrete	=	25kN/m ³
Density (DIN 18281)	=	KF –flou concrete
Pmax	=	60.0 kN/m ²



Load Acting on Tie Rod

Average pressure = $(60.0 \text{ kN/m}^2 + 60.0 \text{ kN/m}^2 + 41.3 \text{ kN/m}^2) / 3 = 53.76 \text{ kN/m}^2$

Load = (Average pressure X Tributary width X distance between two tie rod)
 = $53.76 \text{ kN/m}^2 \times 1.0\text{m} \times 1.2\text{m} = 64.52 \text{ kN} < 90 \text{ kN}$



REFERENCE STANDARD *Refer User manual (Sheet no. 41)*

REGULATORY REFERENCES:

Law Decree April 9, 2008 , no. 81 implementation of art. 1 of the law of August 3, 2007, no. 123, regarding employee health and safety in the workplace (g.u. no. 101 of April 30, 2008) updated by Law Decree August 3, 2009, no. 106

Dlgs. August 14, 1996 no. 494 Implementation of Directive for worksites 92/57 CE

L. March 19, 1990 no. 55 "Plan of measures for physical safety of workers" D.M. November 28, 1987 no. 592, Implementation of Directive 84/532 CEE

D.RR. January 7, 1956 no. 164 Injury prevention on construction worksites

D.RR. July 24, 1996 no. 459 Received European Directive "machines"

Law Decree. September 19, 1994 no. 626 Implemented CE Directive on worker safety and health, D.RR. April 27, 1955 no. 547

Regulation for prevention of work injuries CNR UNI110027/85 Steel structures for provisional constructions

CNR UNI 10011/85 and foll. UNI

50.00.206.0/01/99 Formworks and general requirements for the design, construction & use Ministry Labour Circular Letter 80/86

Technical Attachment 07/07/1986

Ministry Labour Circular Letter 15/80

(Substituted circular 80/86)

Ministry Labour Circular Letter 18/81

(Substituted circular 80/86)

Ministry Labour Circular Letter 13/82 Systems and means against falls

UNI EN 1065 Steel Props, Technical datasheet ISPESL Steel props

CEN TC53 WG12 PR EN Vertical formworks

EN 12813 Scaffolding with prefabricated elements EN13374 Protective parapets

EN1263/1/2 Safety nets

EN13377 Wooden prefabricated beams

Law Decree. July 8, 2003 no. 235 Implementation CE – Work equipment

D.RR. July 3, 2003 no. 222 Regulations

regarding minimum contents of Safety and Coordination Plans

Letter of Labour Ministry prot. 22793/OM-

04 of May 14, 1998

Letter of Labour Ministry prot. 22383/PRI of

May 14, 1998

DIN 1052 - Wooden structures

DIN 1055 - Allowed loads for buildings

DIN 4420 - Work and safety scaffolding

DIN 4421 - Shoring structure

DIN 4424 - Steel props and extractions

DIN 18.202 - Tolerances in building construction

DIN 18.215 - Wooden panels for concrete and constructions in reinforced concrete standard measures 0.50 m x 1.50 m, width 21 mm

DIN 18.216 - Anchoring formworks for concrete

DIN 18.217 - Concrete surfaces and panels

DIN 18.218 - Pressure of fresh concrete on vertical formworks

DIN 18.800 - Steel constructions

DIN 68791 - Panels for large concrete surfaces and reinforced concrete, in plywood laths and scantlings