

# Use of aluminium in road equipment structures at the Quebec Transport Ministry

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AlumForum

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# ACKNOWLEDGEMENTS

- Mario Fafard and CeiAL for the invitation
- Russian Aluminium Association for accepting to translate my presentation from French into Russian



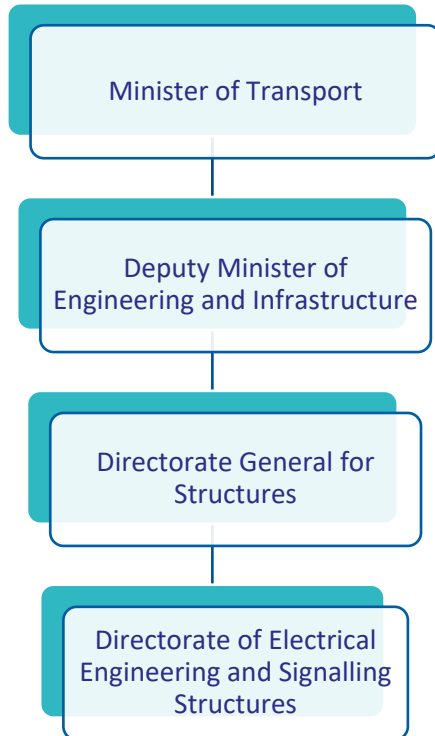
# PRESENTATION OUTLINE

- Brief presentation of the MTQ and its network of road equipment structures
- Electrotechnical structures
- Signalling equipment
- Overhead signalling structures
- Roadside signalling structures

# PRESENTATION OF THE MTQ AND ITS NETWORK OF ROAD EQUIPMENT STRUCTURES



# PRESENTATION OF THE MTQ AND ITS NETWORK OF ROAD EQUIPMENT STRUCTURES



- One of the objectives of the Transport Ministry of Quebec (MTQ) is to make road traffic safer by installing electrotechnical systems and signalling structures, to optimise the return on investment and to offer a level of comfort that meets the needs of road users.
- The Signalling Structures, Lighting and Signals Module is responsible for supporting the territorial branches by providing expertise in the management, design, maintenance, evaluation, inventory, inspection of signalling structures, lighting and illuminated signals.

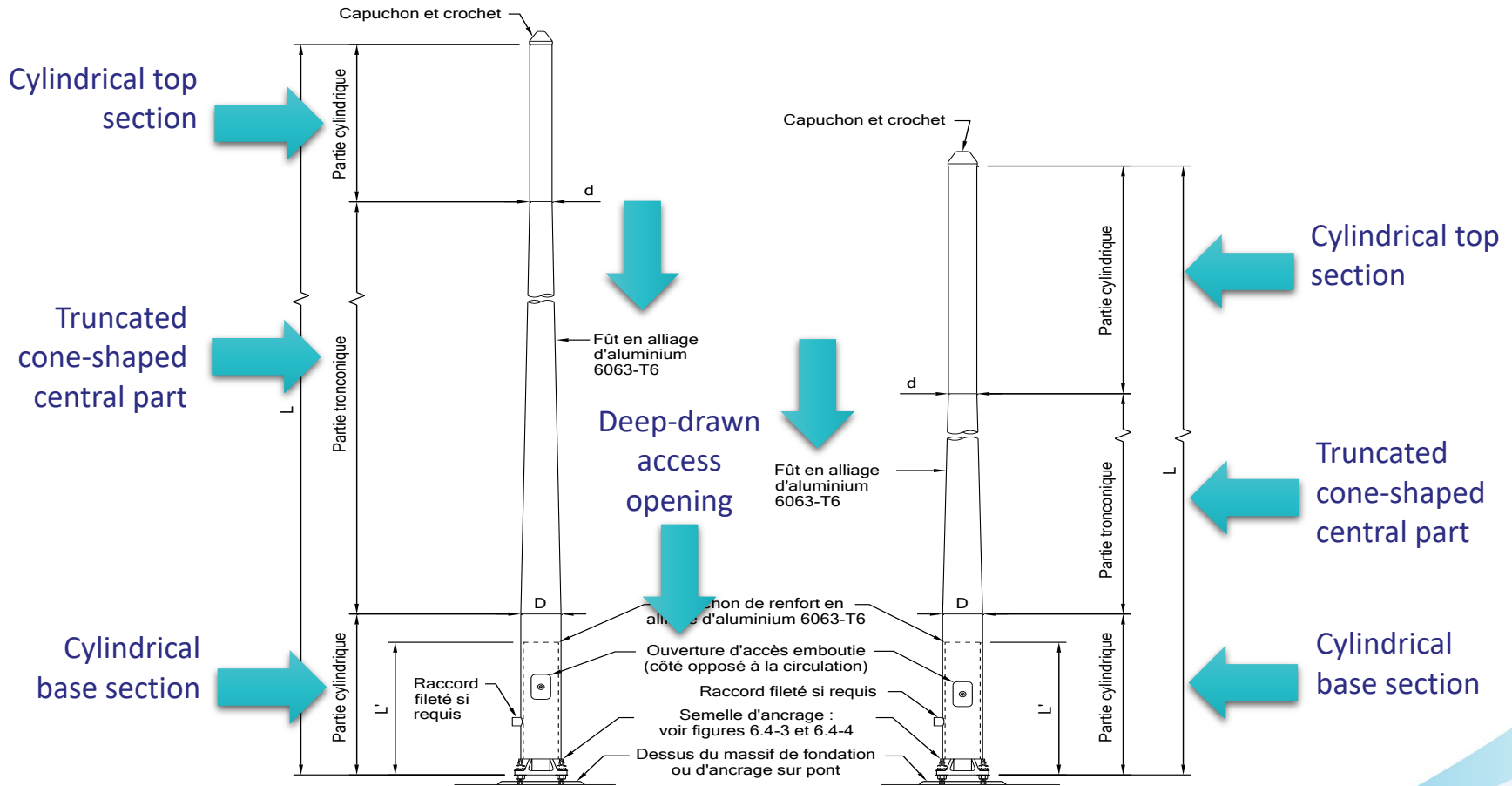
# PRESENTATION OF THE MTQ AND ITS NETWORK OF ROAD EQUIPMENT STRUCTURES

Type de structure	Figures	Type de structure	Figures	Type de structure	Figures	Type de structure	Figures			
SIGNALISATION AÉRIENNE <sup>(1)</sup>	A1		SIGNALISATION LATÉRALE <sup>(1)</sup>	L1X <sup>(2)</sup>		ALIMENTATION	F1			
	A2			L1			B1		F2	
	A3			L2X			E1		F3	
	A4			L2					ÉCLAIRAGE <sup>(2)</sup>	
	A5			L3X		SIGNALAUX LUMINEUX <sup>(1)</sup>				
	A6			L4X						
	A7			L4		L5				
	A8			L6X		L6				
		L7X								

# ELECTROTECHNICAL STRUCTURES



# ELECTROTECHNICAL STRUCTURES



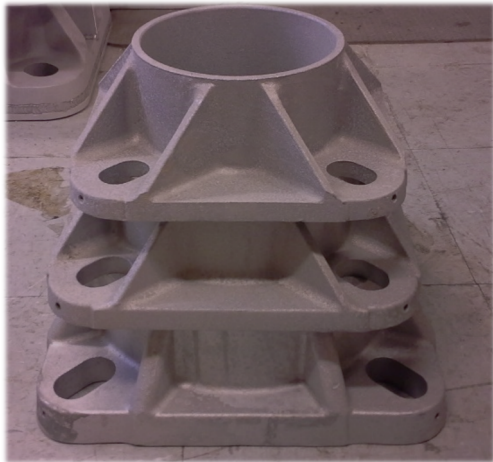
Lighting E1

F1 traffic lights

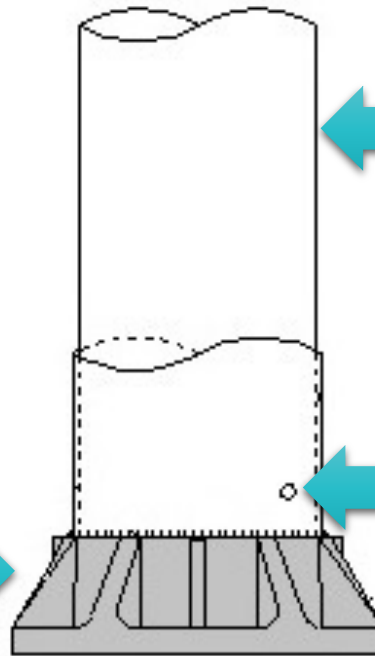


# ELECTROTECHNICAL STRUCTURES

## Reinforcement sleeve and anchor footing



Anchor footing in cast aluminium



6063-T6 aluminium alloy reinforcement sleeve



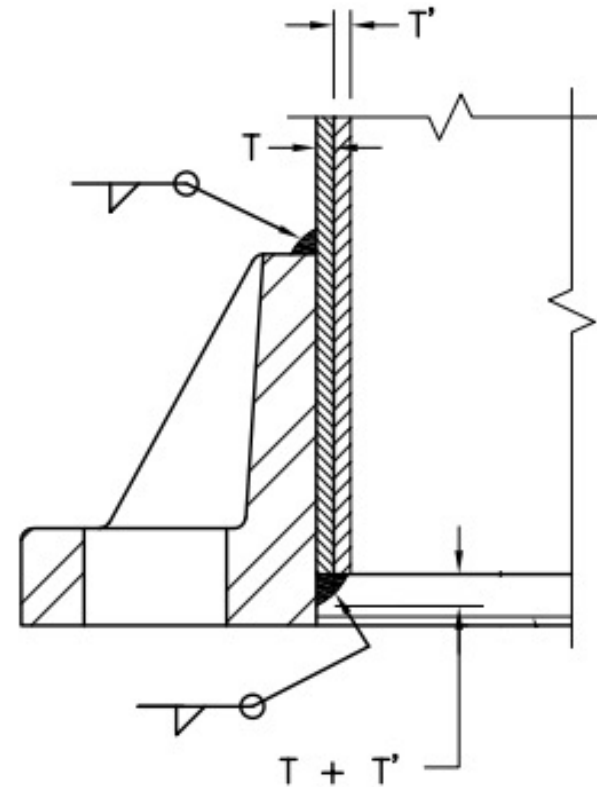
Drainage holes



# ELECTROTECHNICAL STRUCTURES

## Welding and heat treatment

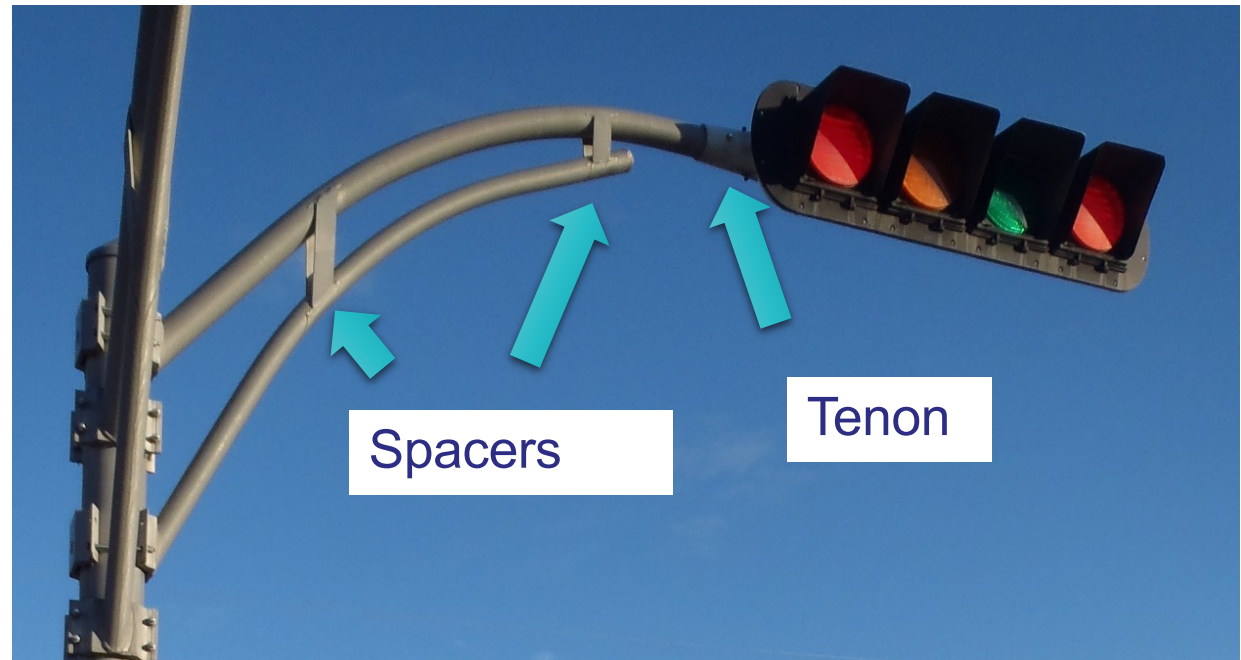
- Anchor footing welded to the base
- After this welding operation, a heat treatment shall be provided



# ELECTROTECHNICAL STRUCTURES

## Radius poles

Assembly of tubular main chords made of 6063-T6 aluminium alloy and braces

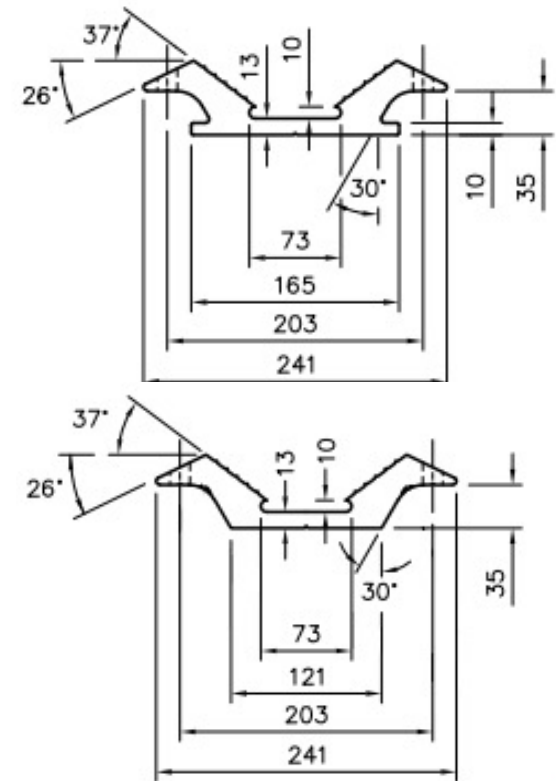


# ELECTROTECHNICAL STRUCTURES

## Connection with clamps



Top –  
profile at the front,  
and  
bottom –  
free profile at the back



# ELECTROTECHNICAL STRUCTURES

## Other equipment



# ELECTROTECHNICAL STRUCTURES

The electrotechnical structures E1 and F1 are installed on:

## 1) Levelling nuts



## 2) Safety and service enclosures

- Aluminium safety box\*.
- Aluminium electrical service box\*
- Galvanised steel electrical service box

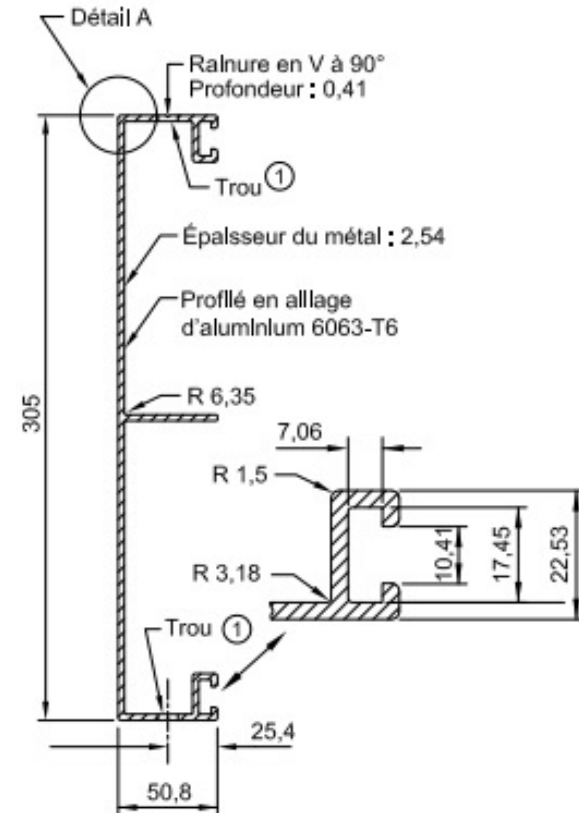


# SIGNALLING EQUIPMENT



# SIGNALLING EQUIPMENT

## Large signal panels





# SIGNALLING EQUIPMENT

## Miscellaneous message signs

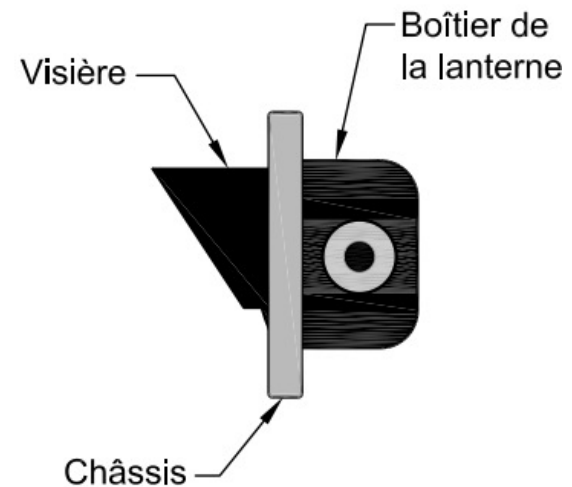


## Small signal signs

# Signalling equipment

## Other

- Enclosures for electrotechnical equipment from aluminium sheet
- Horizontal light head frames



# OVERHEAD SIGNALLING

## STRUCTURES



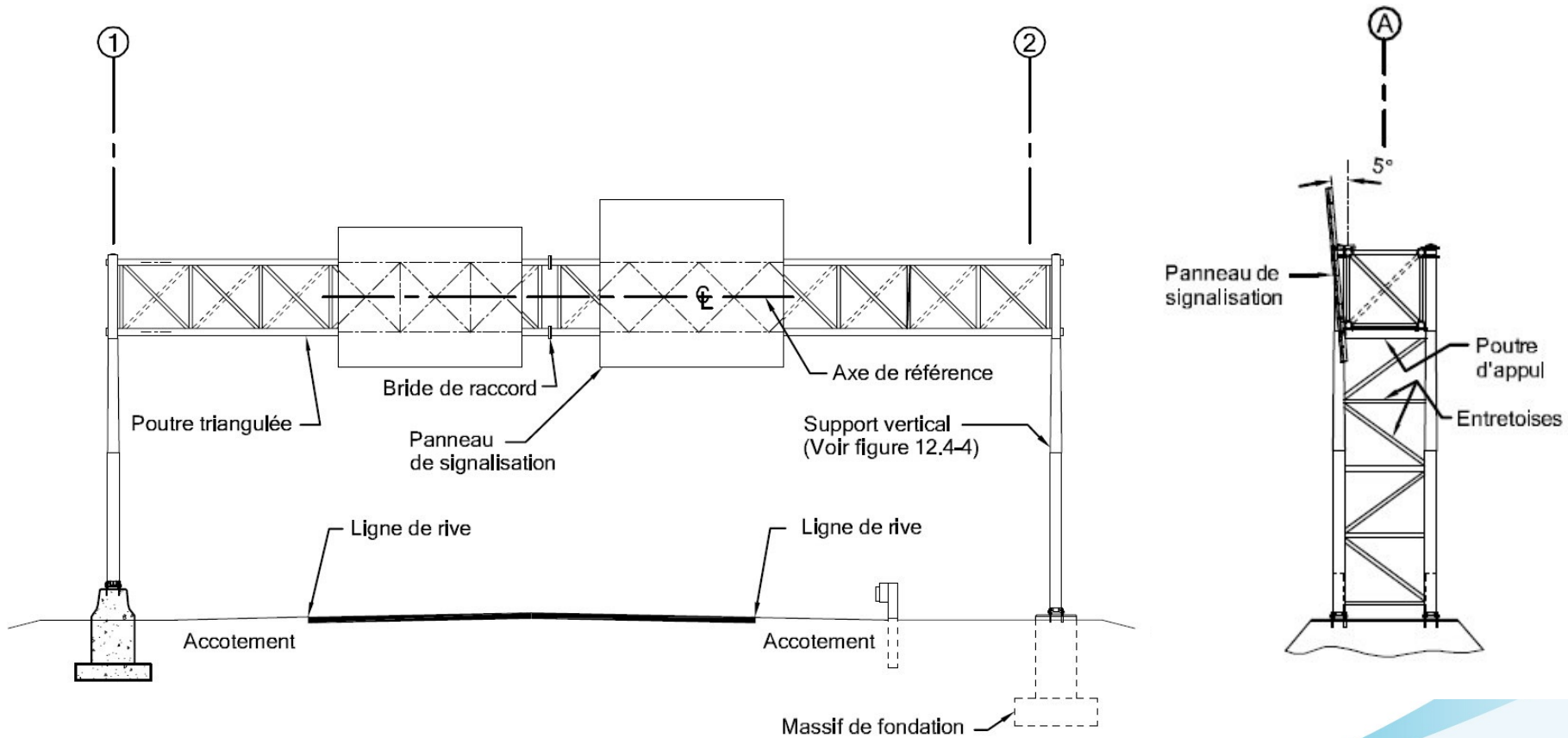
# OVERHEAD SIGNALLING STRUCTURES

## Structures A1



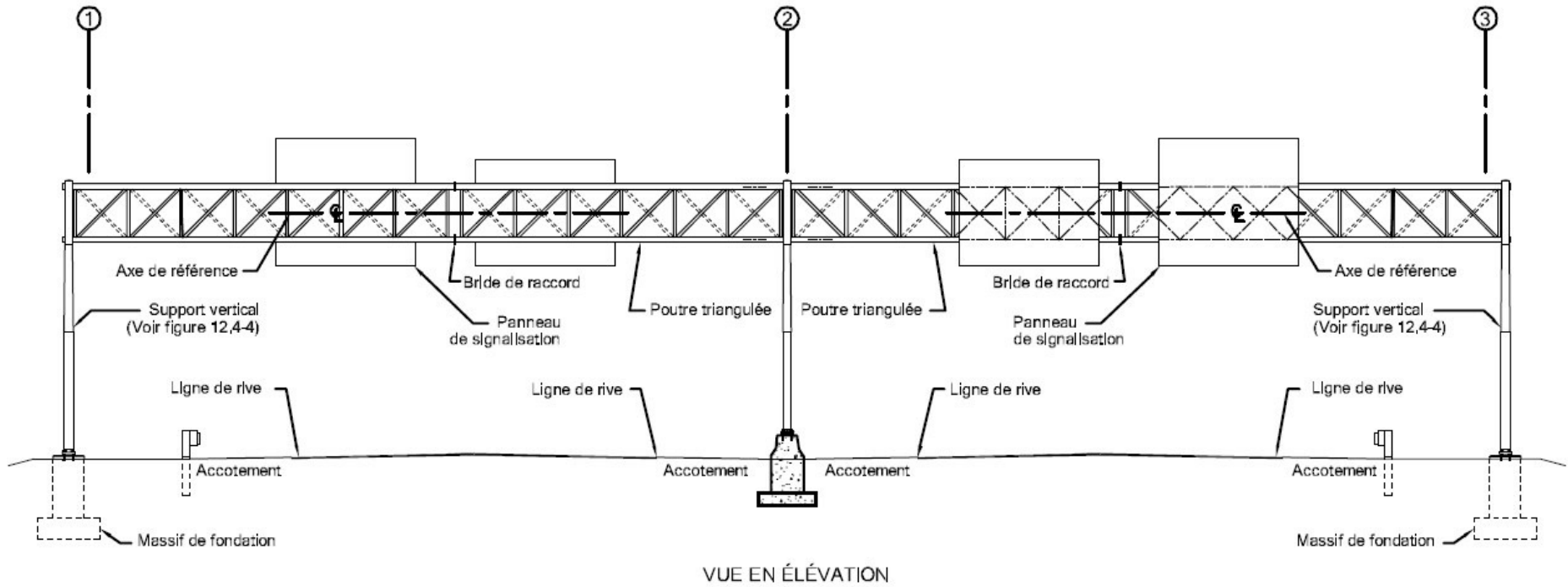
# STRUCTURES DE SIGNALISATION AÉRIENNE

## Structures A1



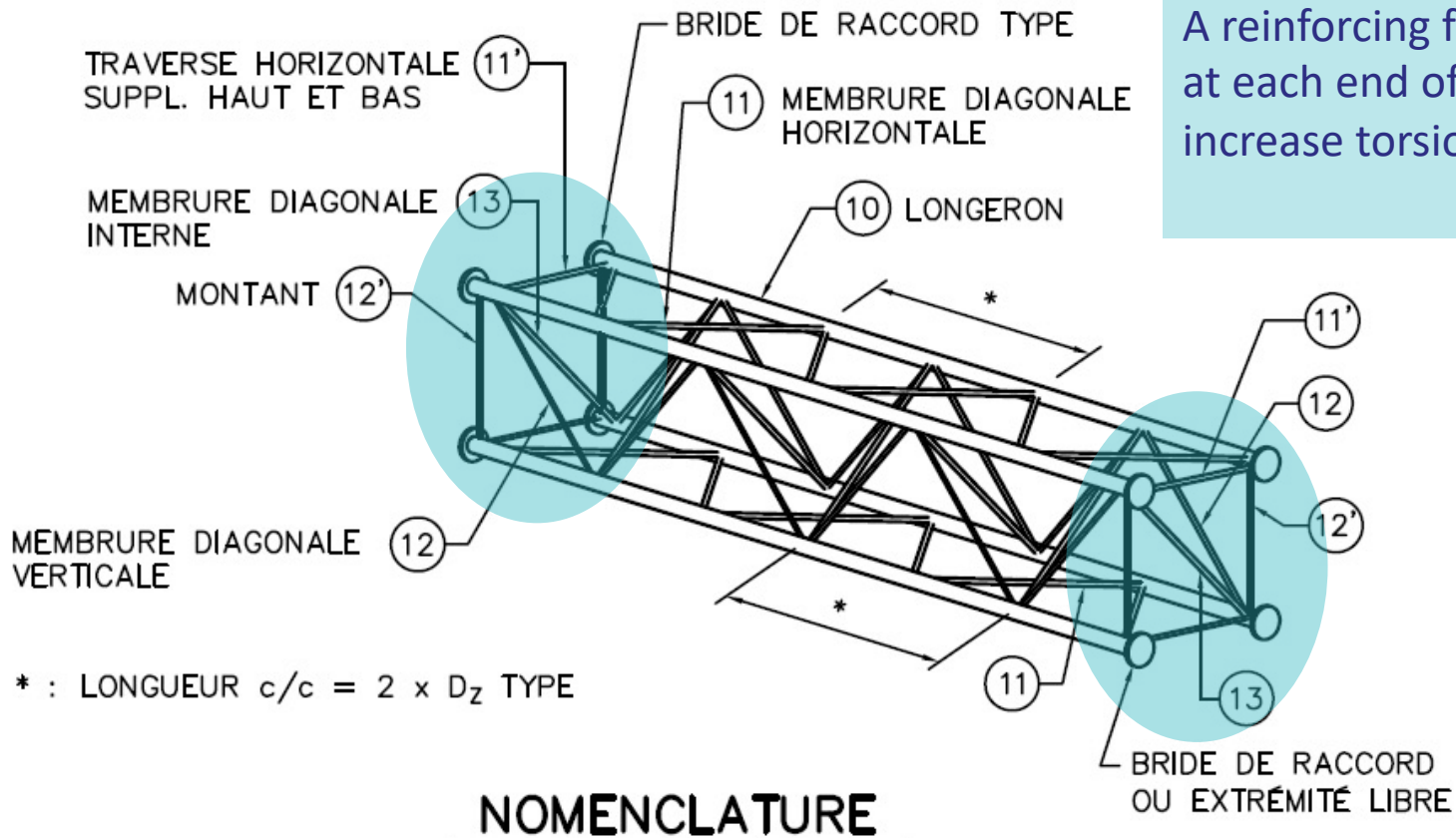
# OVERHEAD SIGNALLING STRUCTURES

## Structures A1 - double span option



# OVERHEAD SIGNALLING STRUCTURES

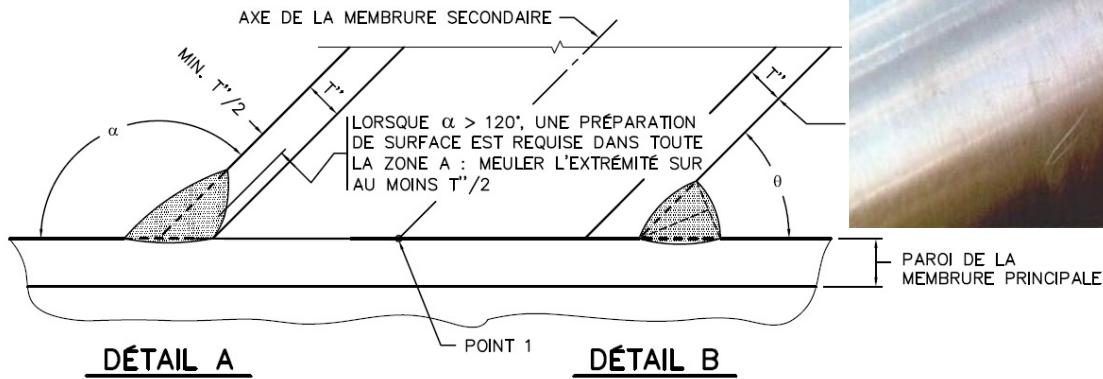
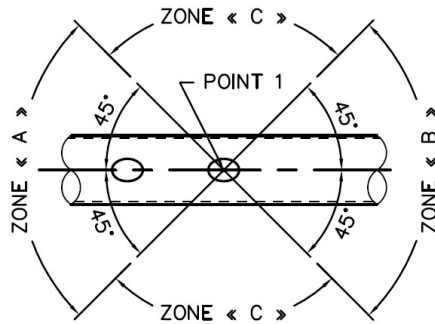
## Horizontal support



A reinforcing frame is required at each end of the segment to increase torsional rigidity

# OVERHEAD SIGNALLING STRUCTURES

## Horizontal support



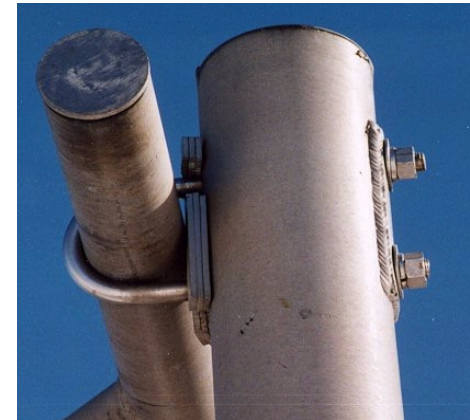


# OVERHEAD SIGNALLING STRUCTURES

## Horizontal support



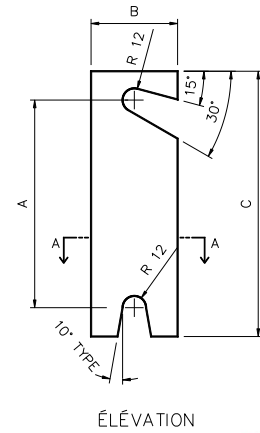
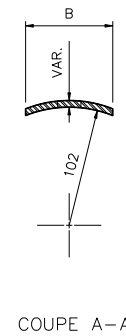
Support Upper (with shims)



4 connecting flanges

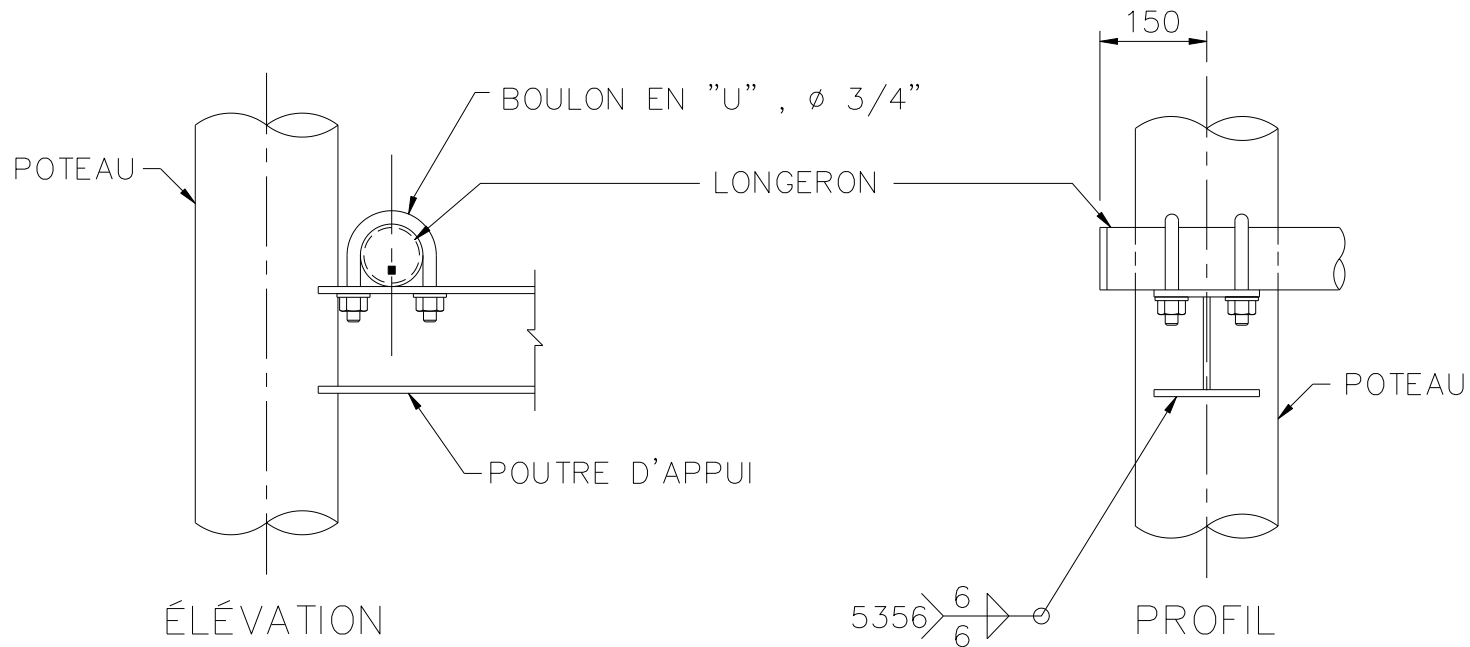


Support lower



# OVERHEAD SIGNALLING STRUCTURES

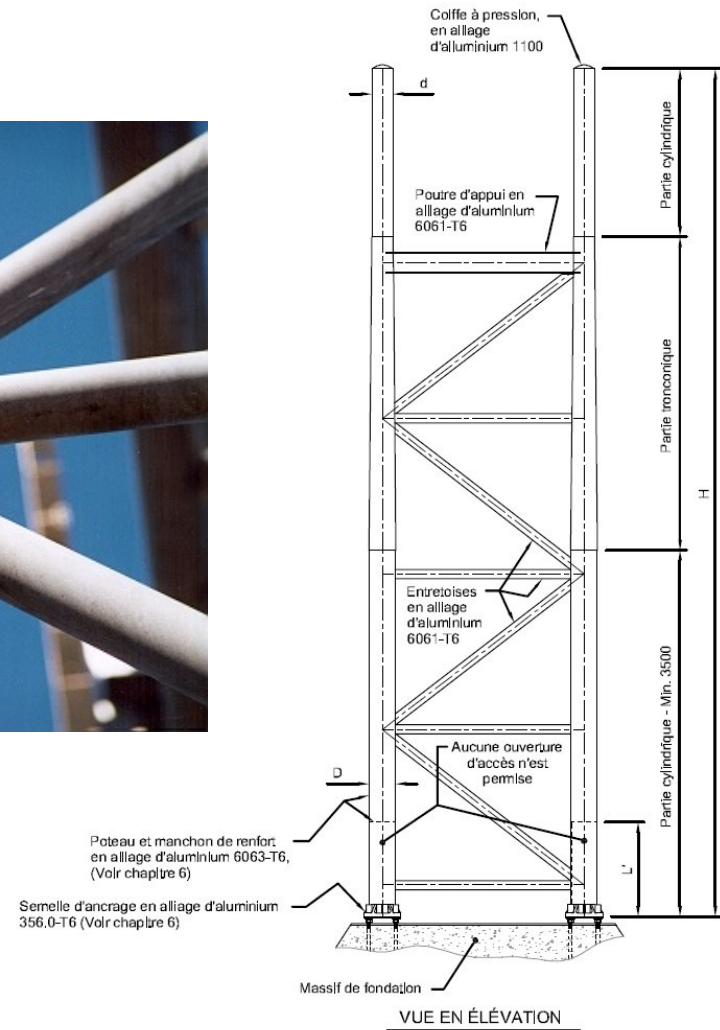
## Assembly of the horizontal support to the vertical support



LOWER SUPPORT

# OVERHEAD SIGNALLING STRUCTURES

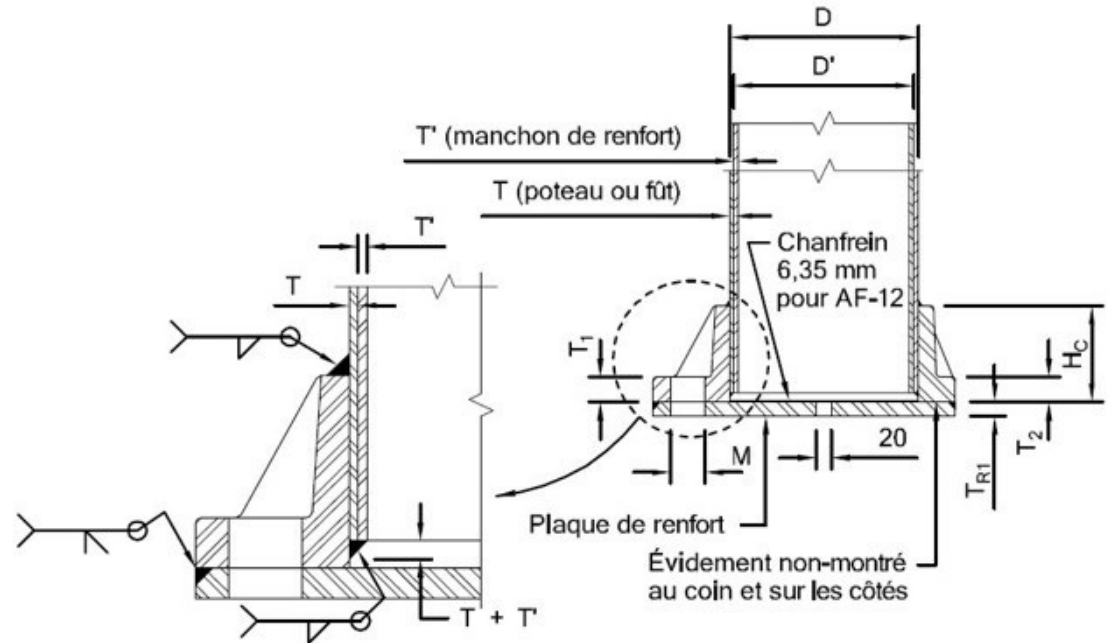
## Vertical lattice support



# OVERHEAD SIGNALLING STRUCTURES

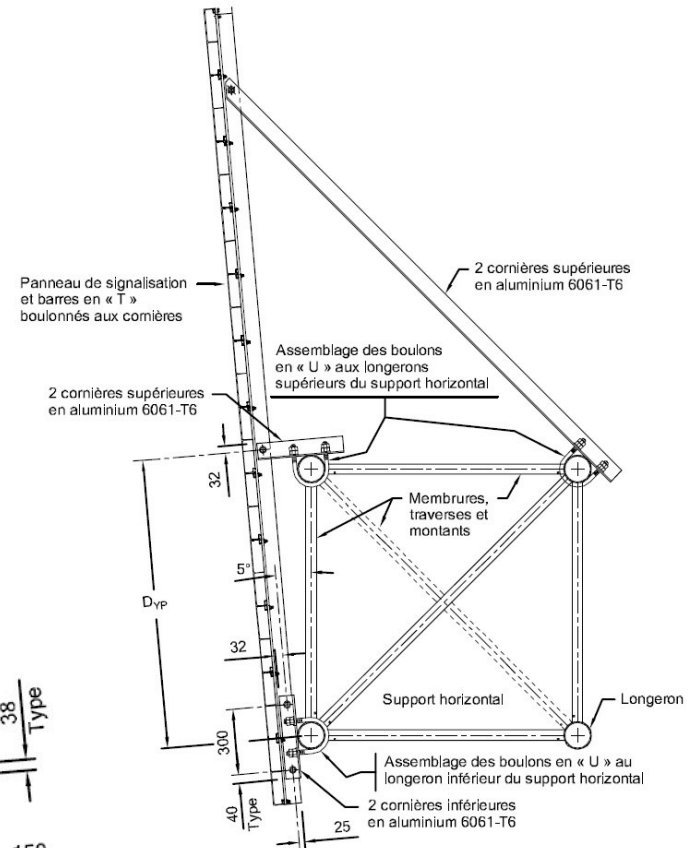
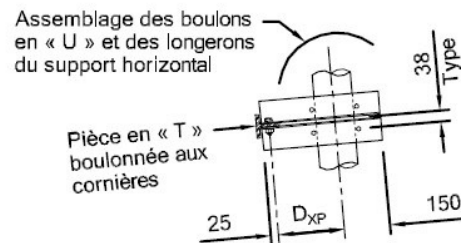
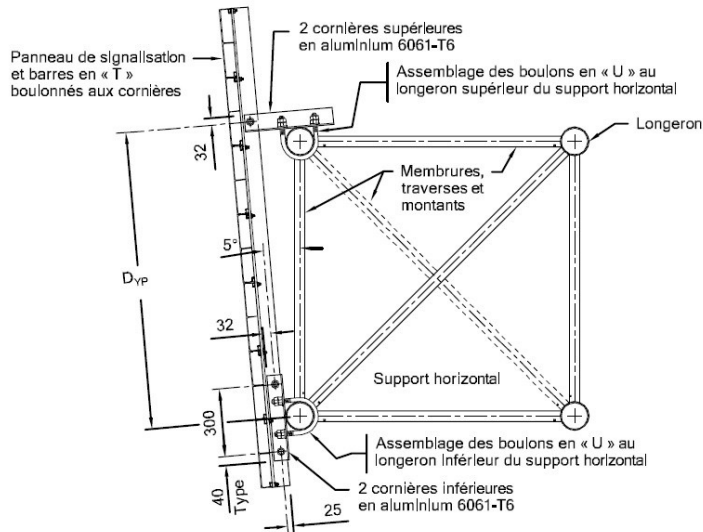
## Assembly at the base of the vertical support

- The two poles are welded to a cast aluminium anchor footing
- For stronger structures, it is possible to reinforce the anchor footing with the largest dimensions



# OVERHEAD SIGNALLING STRUCTURES

## T-bar assembly



# OVERHEAD SIGNALLING STRUCTURES

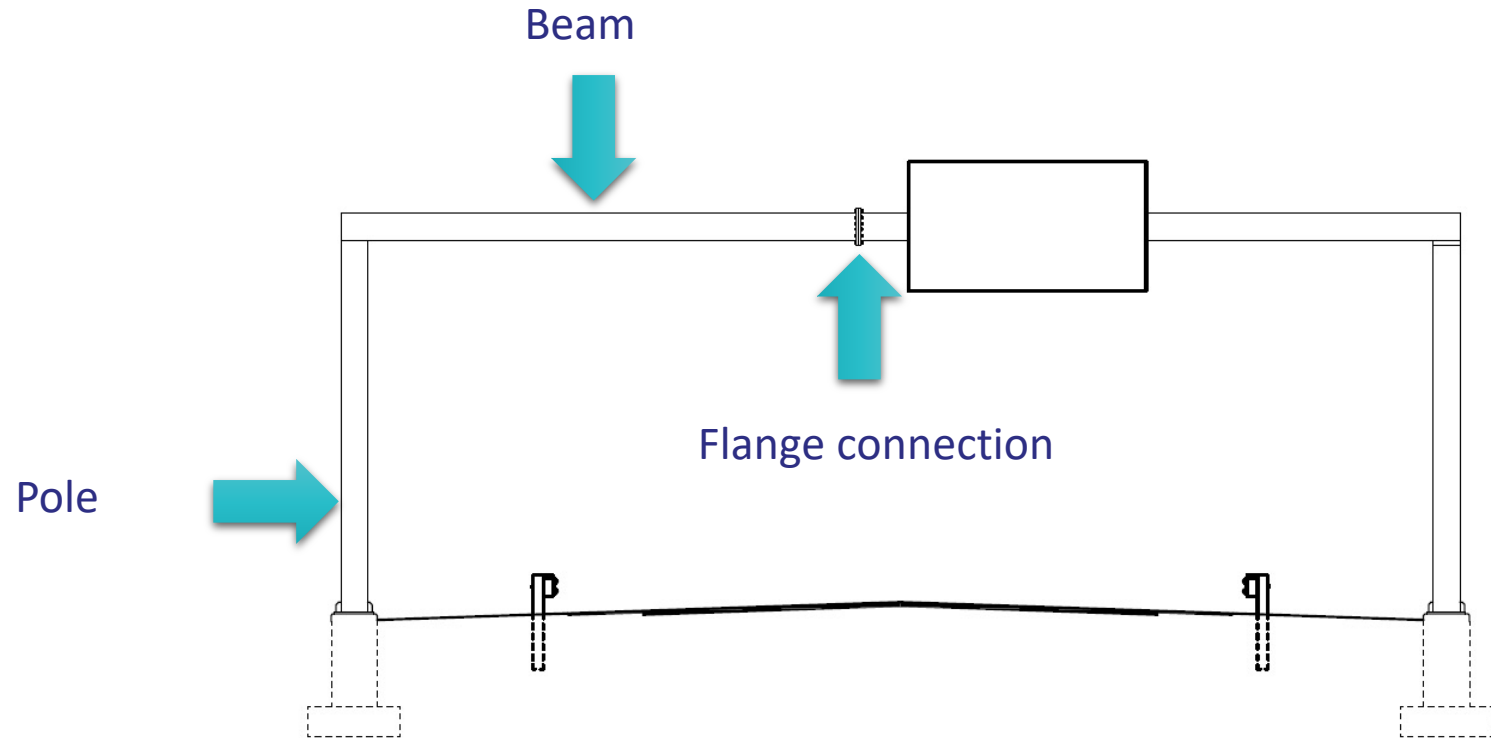
## Structures A6



# STRUCTURES DE SIGNALISATION AÉRIENNE

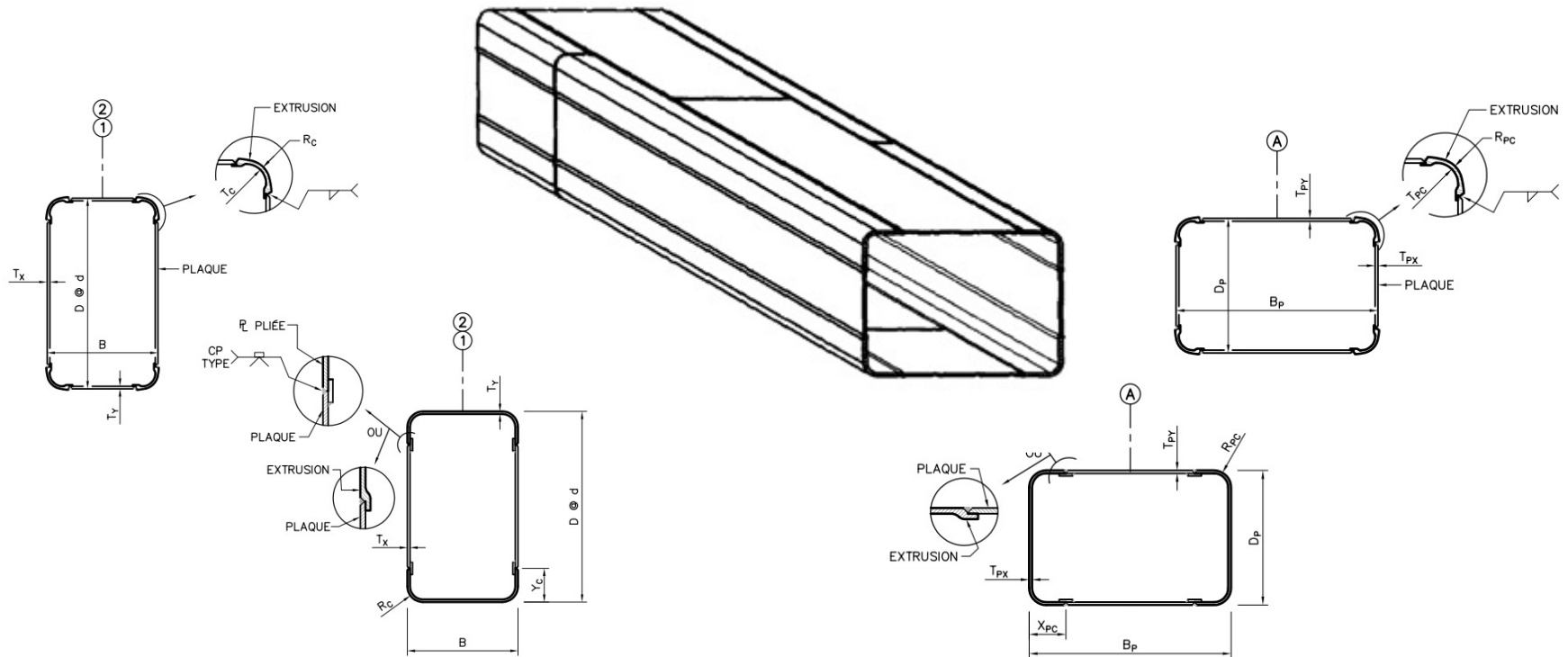


## Structures A6



# STRUCTURES DE SIGNALISATION AÉRIENNE

## Structures A6 - Beam and pole



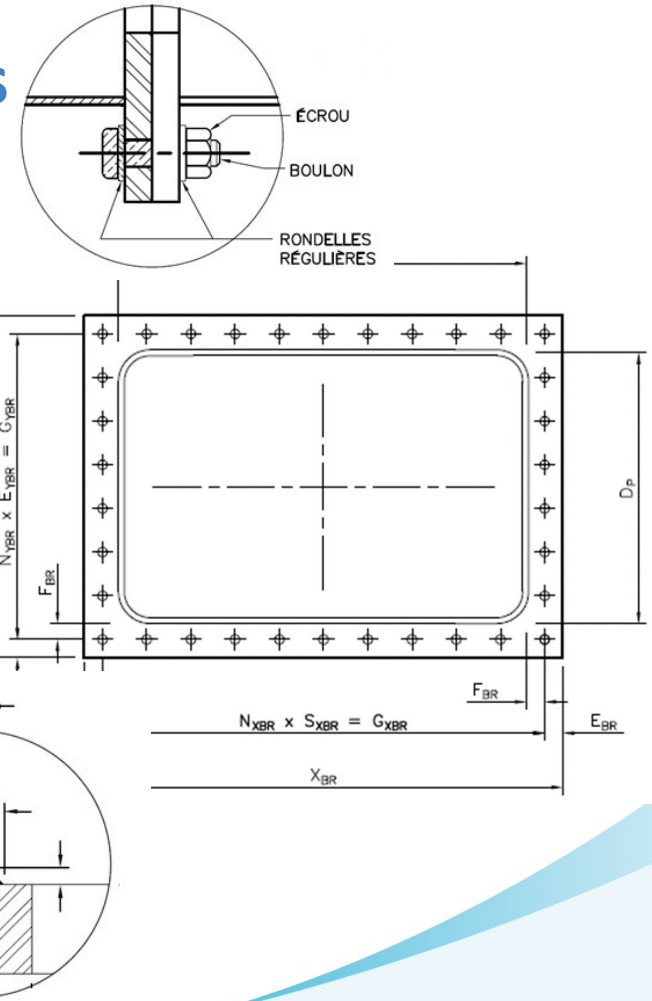


# STRUCTURES DE SIGNALISATION AÉRIENNE

## Structures A6 - Connection flanges



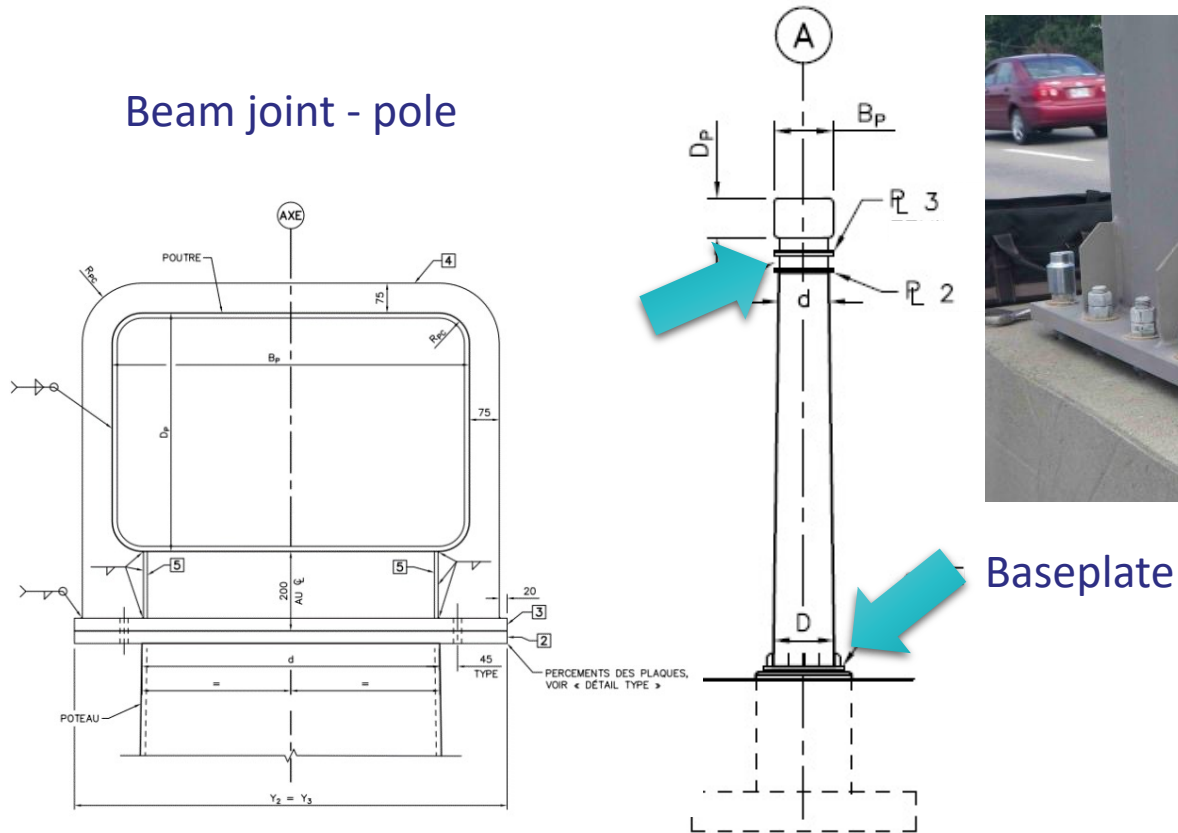
Stiffeners



# STRUCTURES DE SIGNALISATION AÉRIENNE

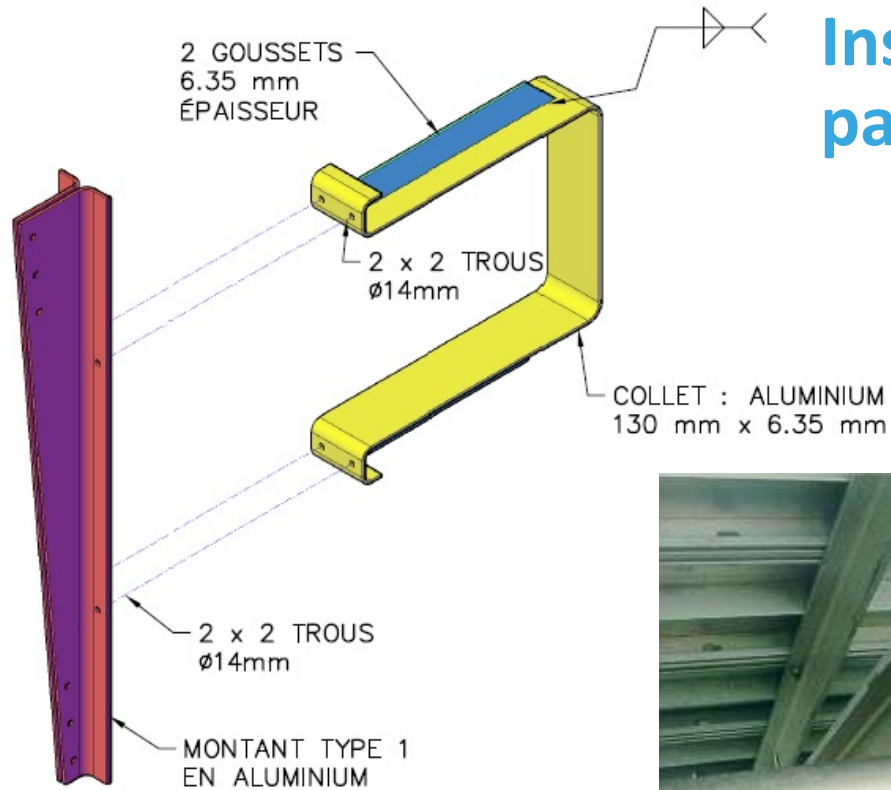
## Structures A6 - Pole

Beam joint - pole



Baseplate

# STRUCTURES DE SIGNALISATION AÉRIENNE



## Installation of large signal panels



# ROADSIDE SIGNALLING STRUCTURES



# ROADSIDE SIGNALLING STRUCTURES

## Structures L1



## Structures L4 and L4X



# ROADSIDE SIGNALLING STRUCTURES

L1

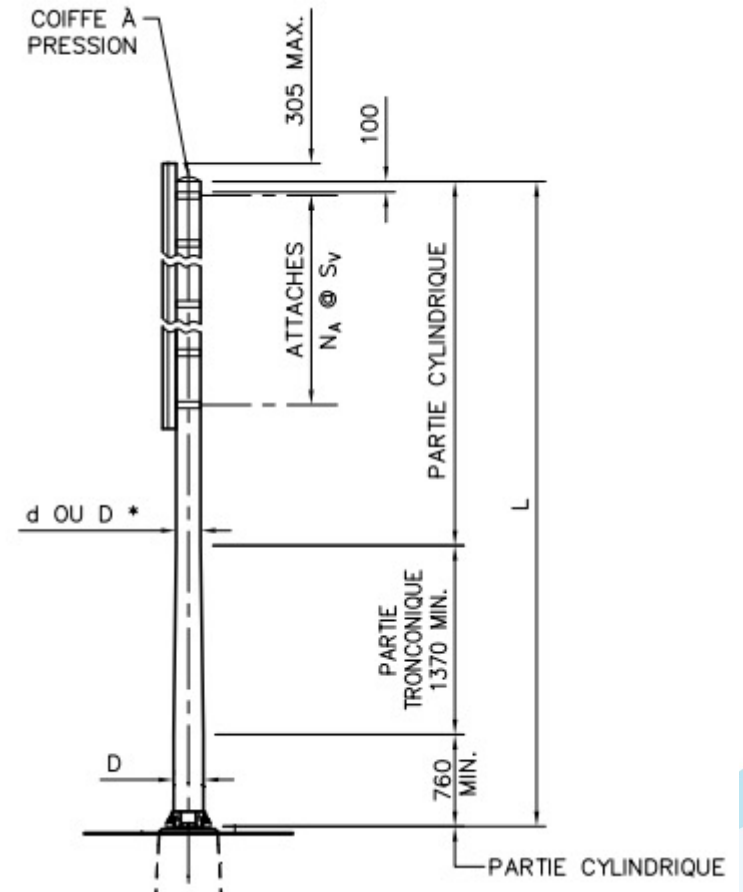
POTEAU EN ALUMINIUM		
D (mm)	d (mm)	T (mm)
152*	102	4,76
178	127	4,76
203*	152	6,35
254*	203	6,35
305	254	6,35
		7,94

L4

POTEAU EN ALUMINIUM		
D (mm)	d (mm)	T (mm)
203*	152	6.35
254*	203	6.35
		7.94
305	254	6.35
		7.94

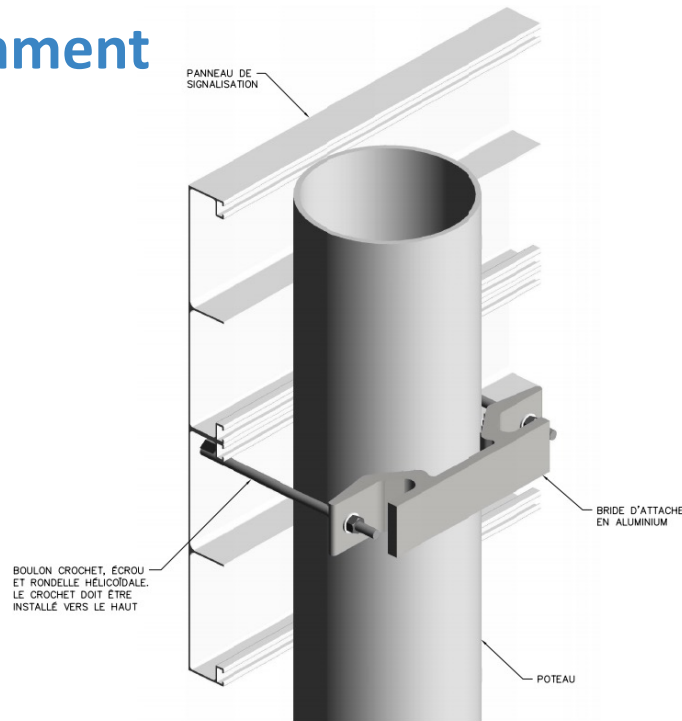
L4X

POTEAU EN ALUMINIUM		
D (mm)	d (mm)	T (mm)
203*	152	6.35
254*	203	6.35
		7.94



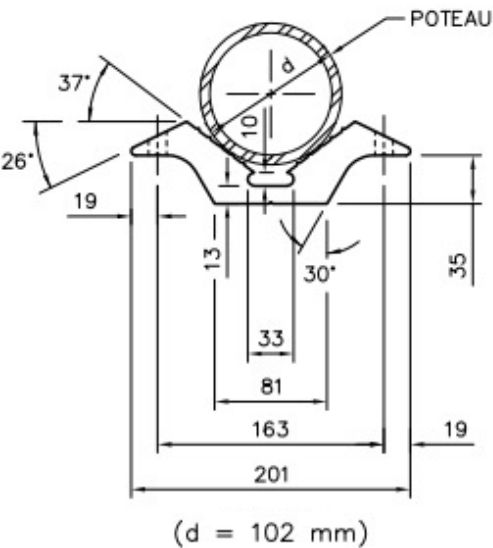
# ROADSIDE SIGNALLING STRUCTURES

## Structures L1, L4 and L4X - Attachment flange

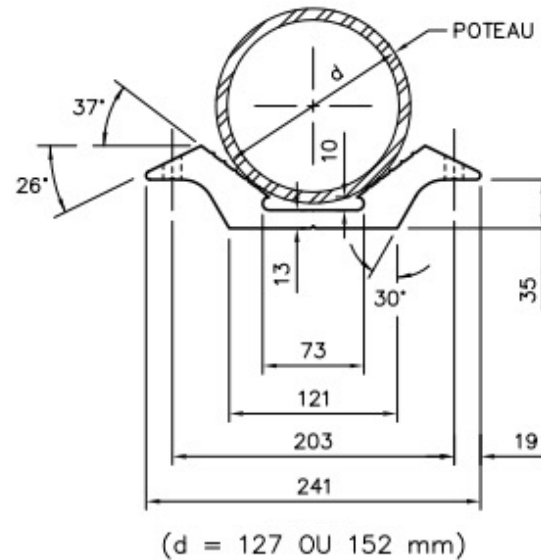


# ROADSIDE SIGNALLING STRUCTURES

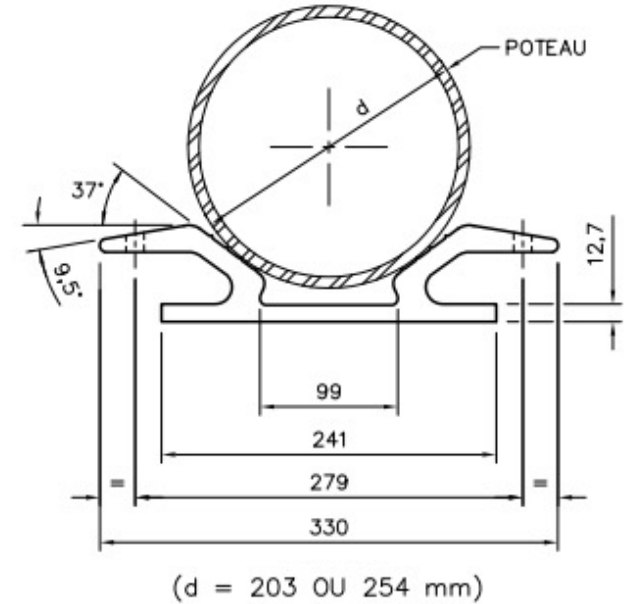
## Structures L1, L4 and L4X - Attachment flange



**BRIDE D'ATTACHE**  
EXTRUSION TYPE 201  
ALUMINIUM



**BRIDE D'ATTACHE**  
EXTRUSION TYPE 241-L  
ALUMINIUM



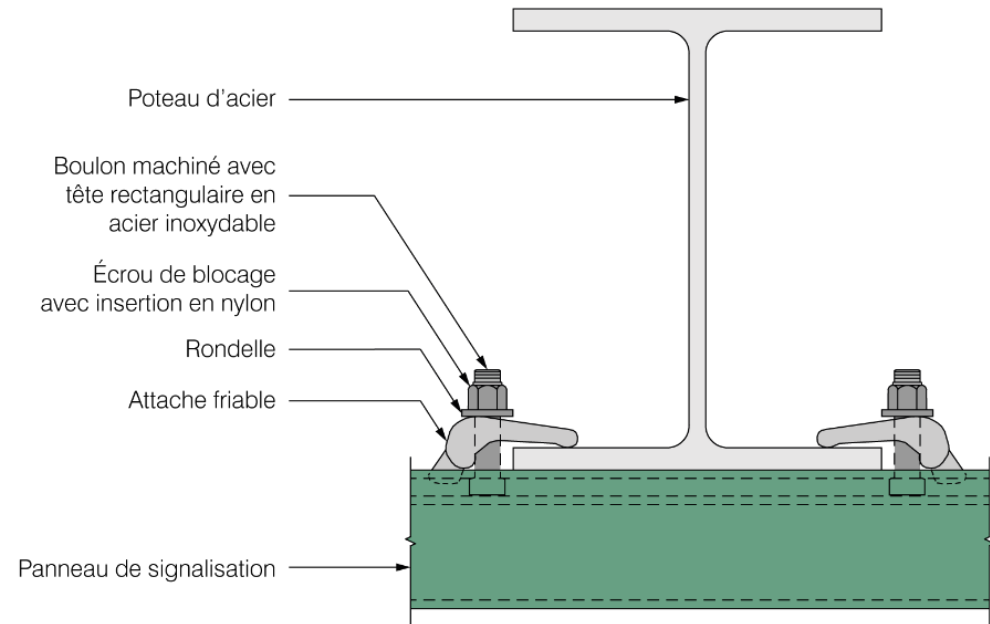
**BRIDE D'ATTACHE**  
EXTRUSION TYPE 330  
ALUMINIUM



# ROADSIDE SIGNALLING STRUCTURES

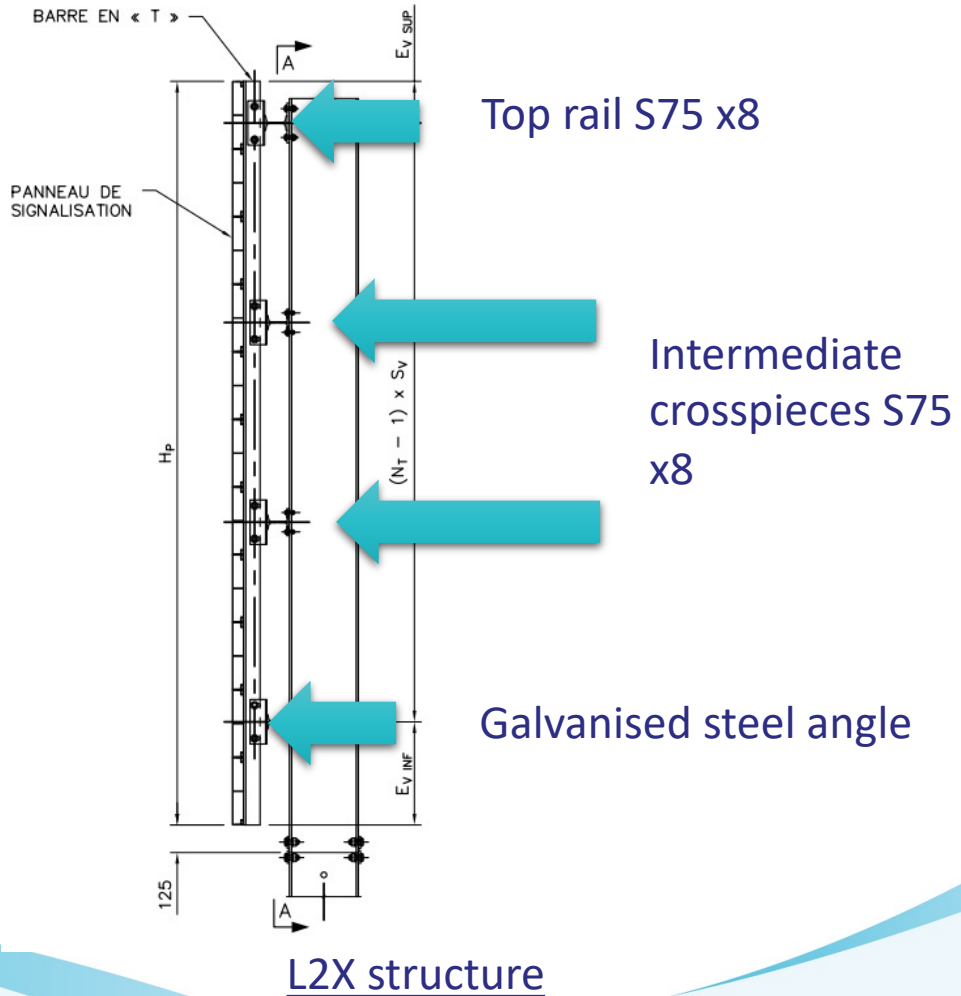
## Structures using both materials

- Structure type L2, galvanised steel
- Panels are fixed directly to the I-pole



# ROADSIDE SIGNALLING STRUCTURES

## Structures using both materials



# QUESTIONS?

