

On propose de modéliser, à l'aide du logiciel RDM Le-Mans, le comportement d'un pont.

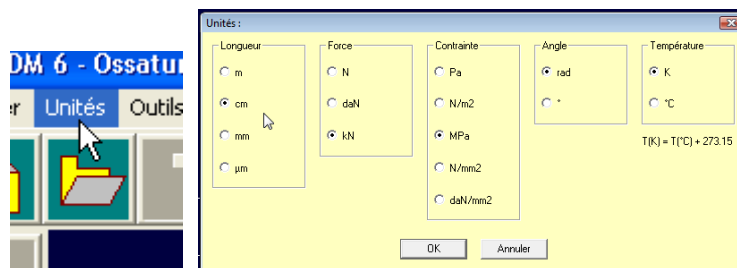
Cette modélisation sera faite en plan et ne représentera que la ½ structure.

1 - MODELISATION DE LA STRUCTURE

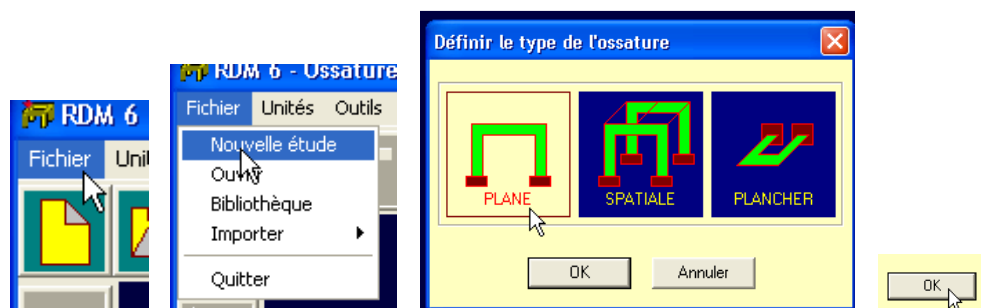
Lancement du logiciel :



Choix des unités de travail :



Créer une étude :



Nœuds

Ajouter des noeuds

Longueur

☐ M

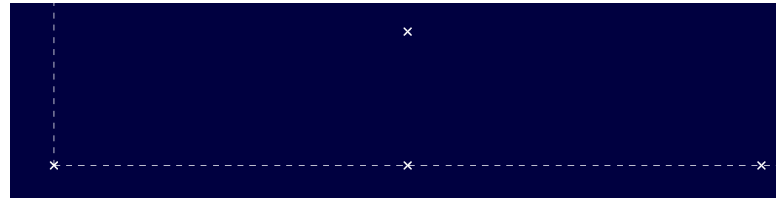
☒ CM

☐ MM

☐ µM

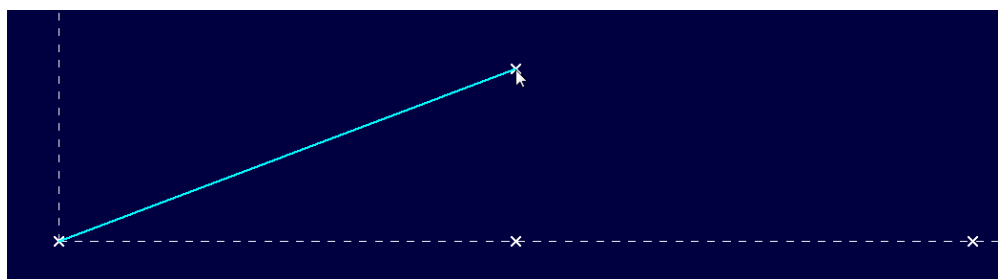
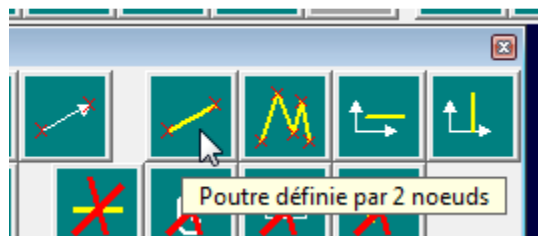
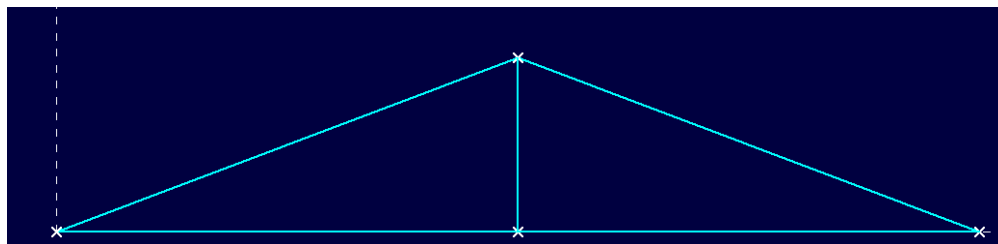
	x	y
Noeud 1	0	0
Noeud 2	40	0
Noeud 3	80	0
Noeud 4	40	15
Noeud 5		
Noeud 6		
Noeud 7		
Noeud 8		
Noeud 9		
Noeud 10		

OK Annuler

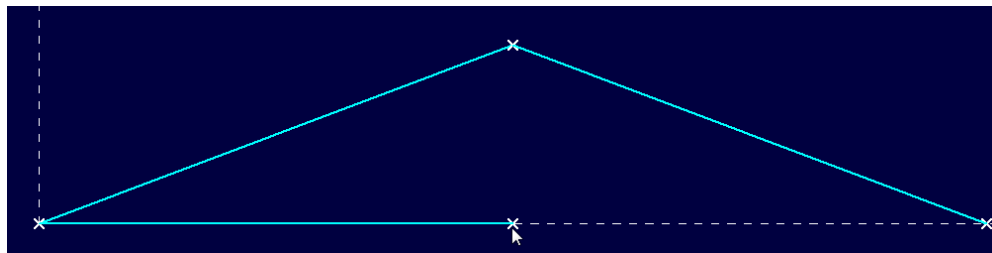


Barres (éléments)

Image à obtenir :

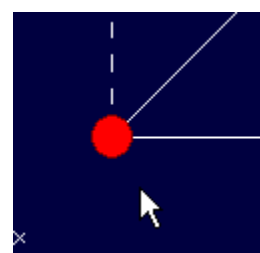
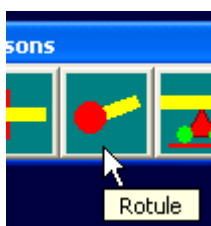
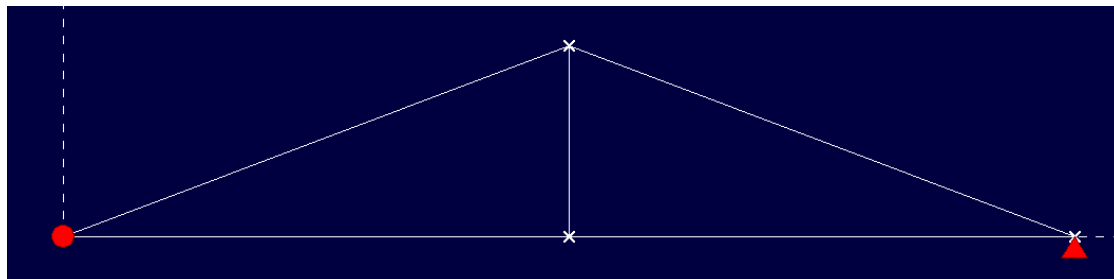


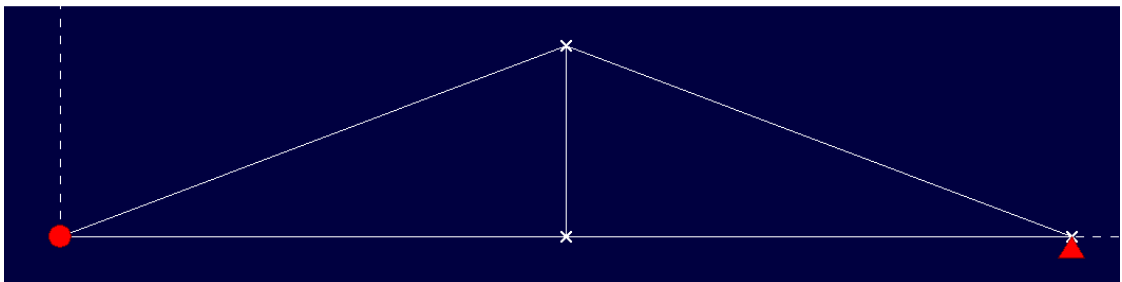
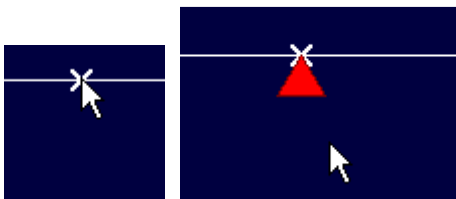
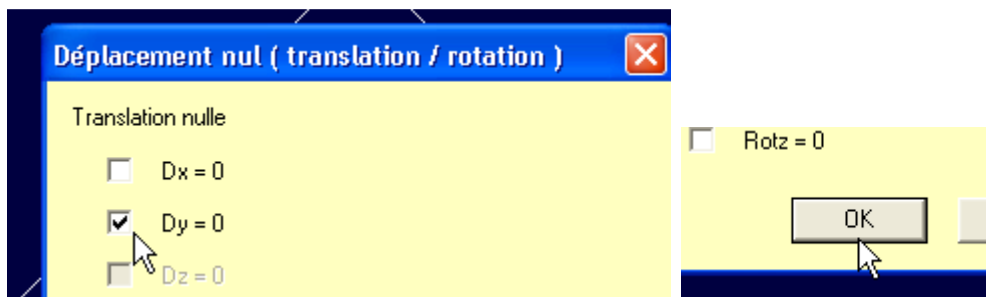
Attention : la barre inférieure (tablier du pont) doit être créée en 2 éléments ! de nœud à nœud



Liaisons externes (appuis)

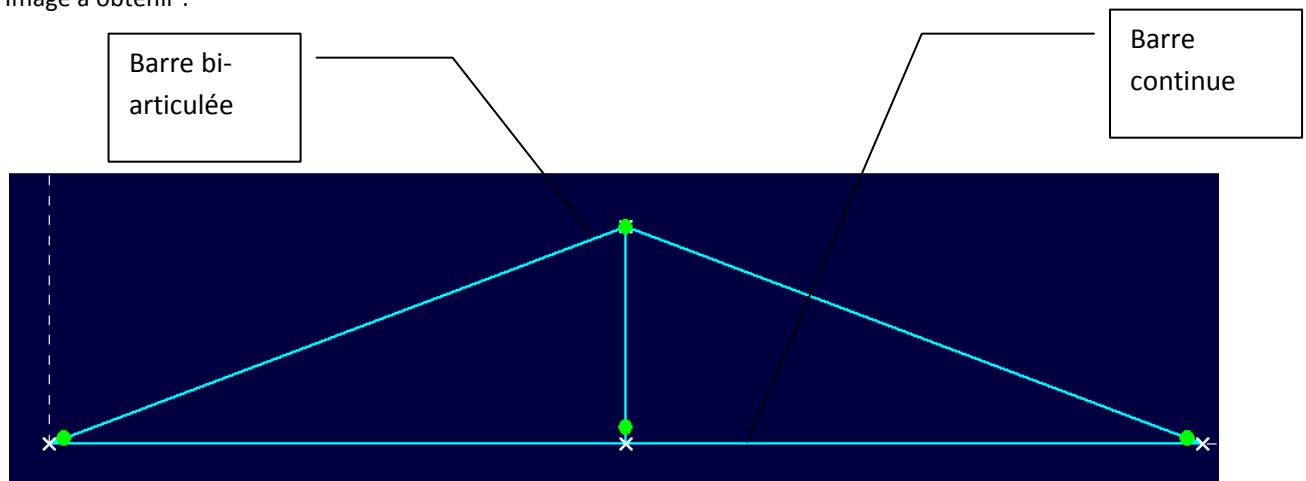
Image à obtenir :





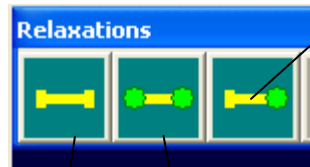
Relaxations (liaisons internes)

Image à obtenir :



Par défaut, toutes les barres créées sont encastées les unes aux autres.

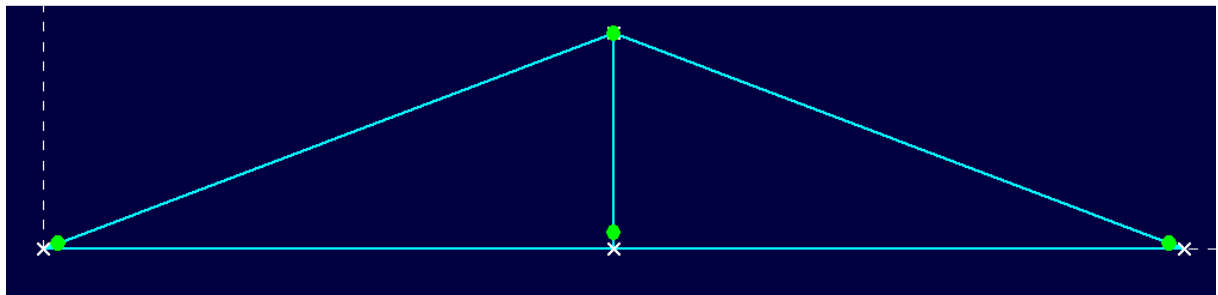
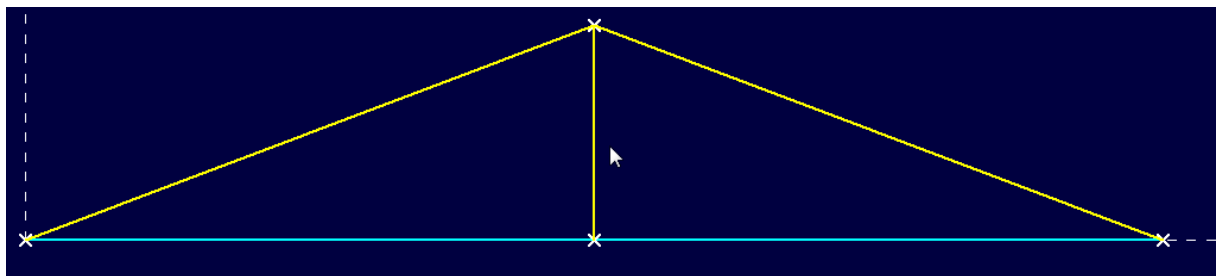
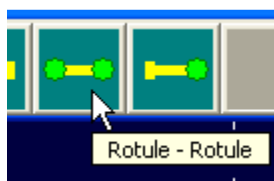
Si l'on veut obtenir des articulations, il faut les relaxer (obtention d'une rotation en Z)



Barre
encastrée -
articulée

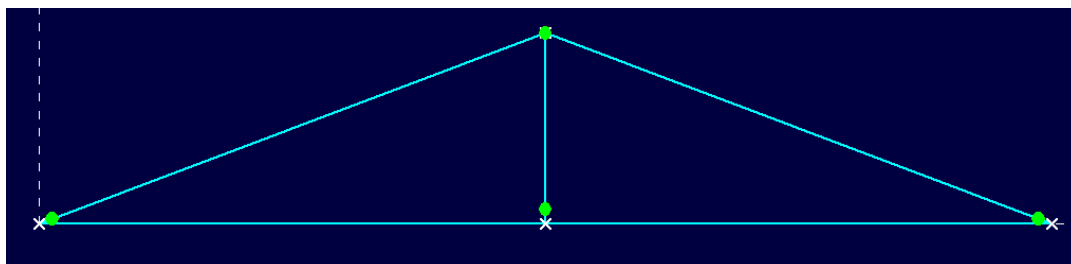
Barre encastrée aux
2 extrémités

Barre bi-
articulée



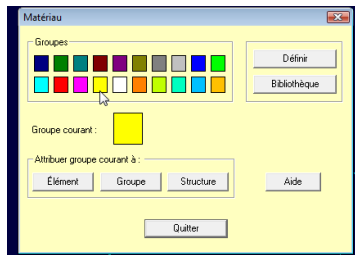
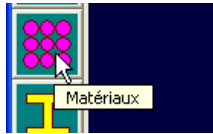
Matériaux

Les éléments seront volontairement de matériaux différents :

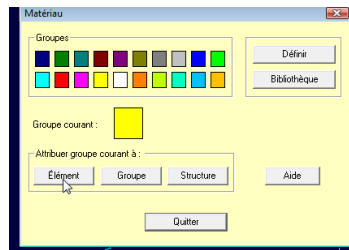


La barre verticale est en acier, les autres en bois C18

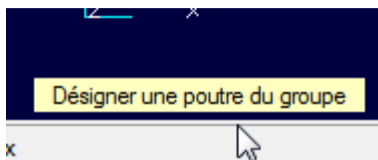
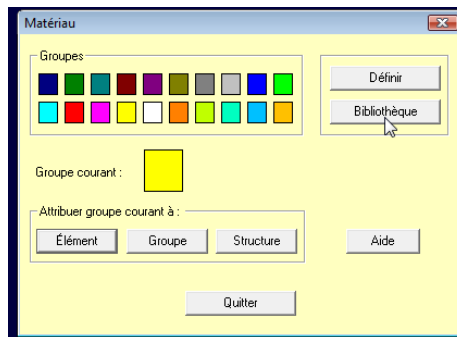
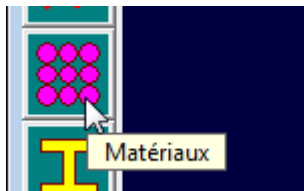
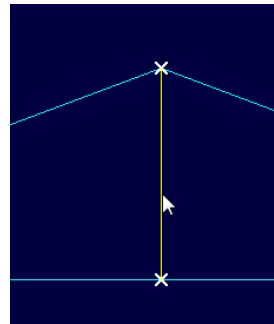
Pour différencier les matériaux, il faut affecter une couleur aux éléments. Toutes les poutres d'une même couleur auront le même matériau.



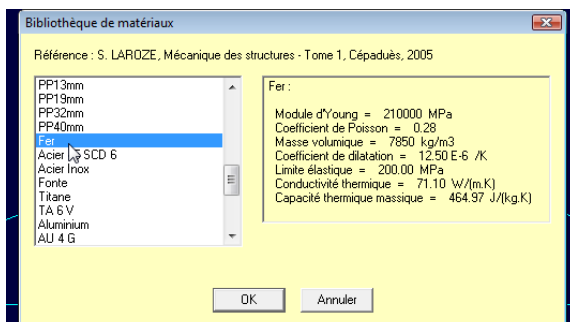
Choisir une couleur :



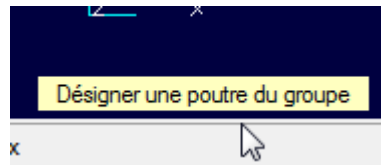
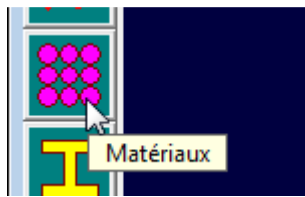
Attribuer à un élément :



sélectionner la barre verticale

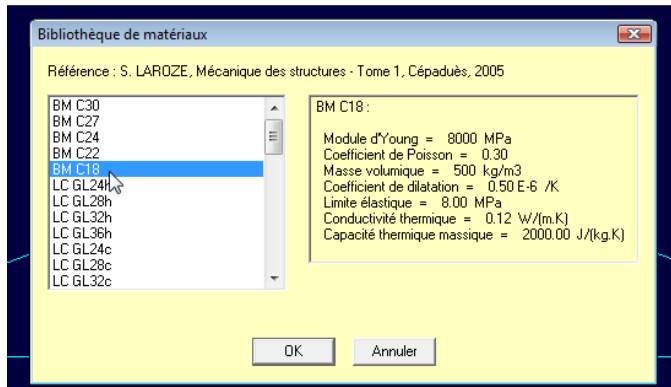


la désignation fer correspond, en fait, à un acier ... de structure



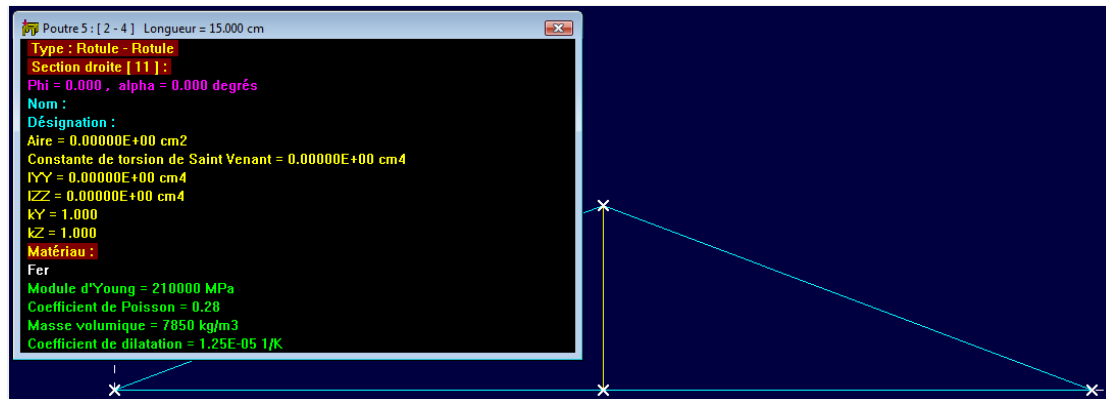
désigner n'importe quelle autre poutre

Toutes les poutres d'une même couleur auront le même matériau.



c'est du bois de structure (pin maritime)

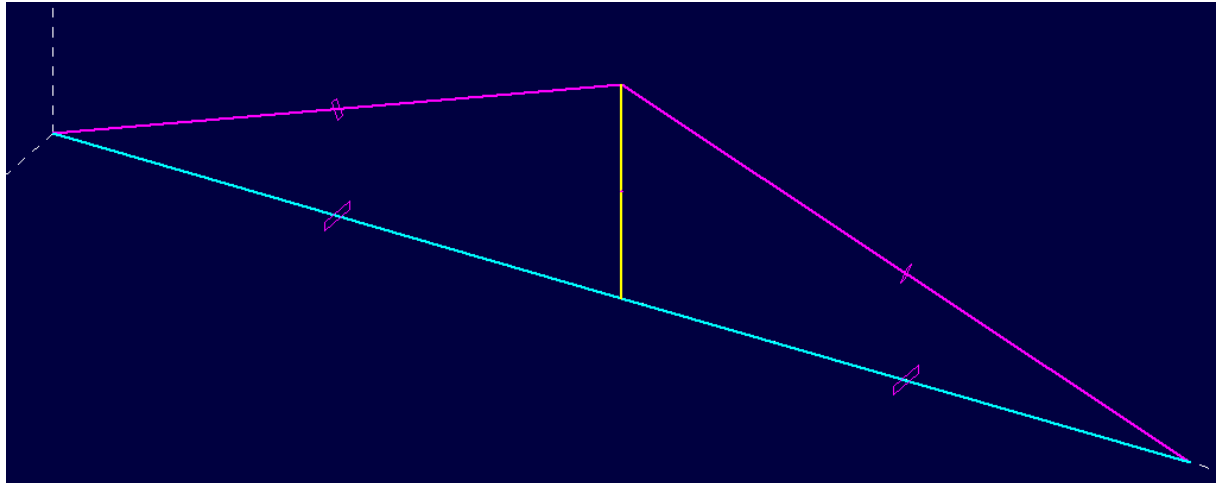
Vérification : en cliquant sur une poutre (bouton droit) on obtient les renseignements suivants :



On vérifie ainsi que le matériau est bien affecté à la barre.

Sections

On aura ici 3 sections différentes :

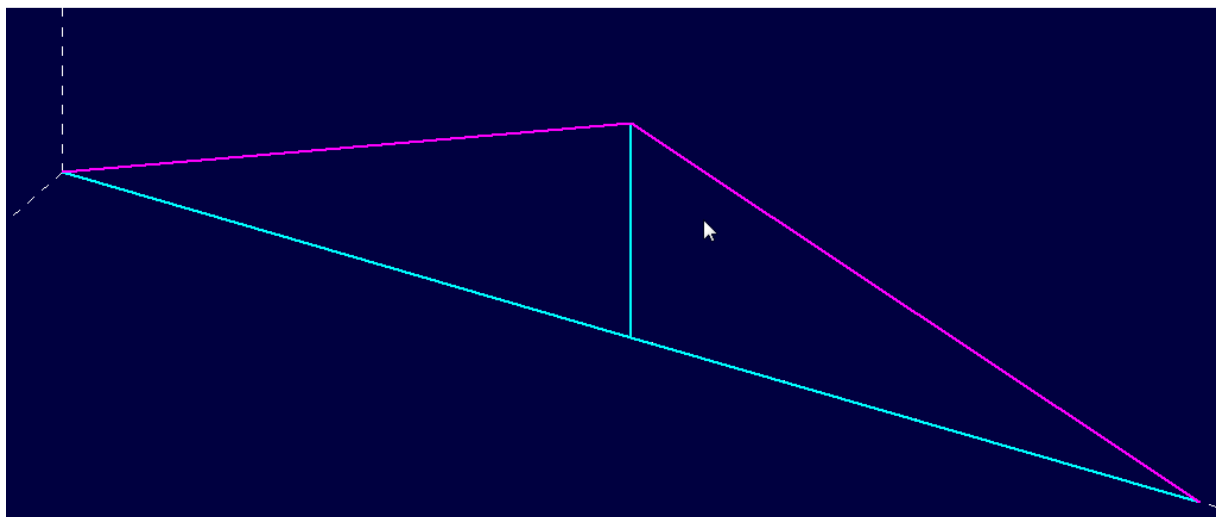
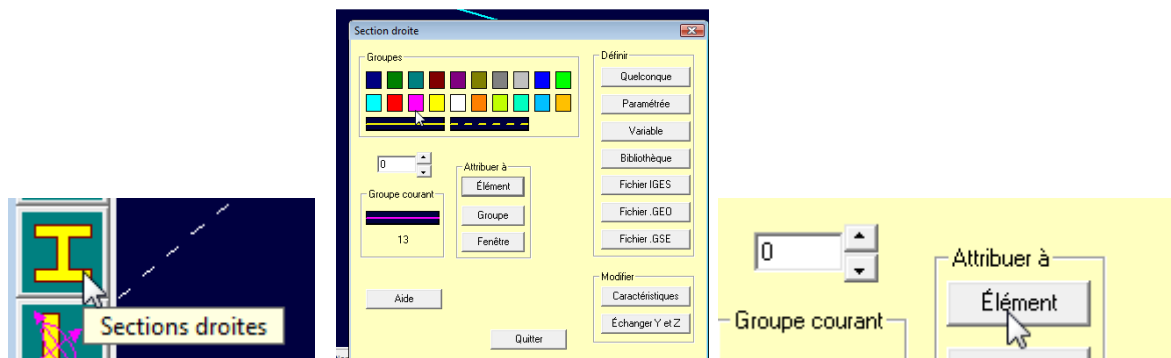


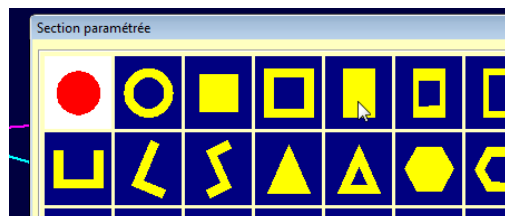
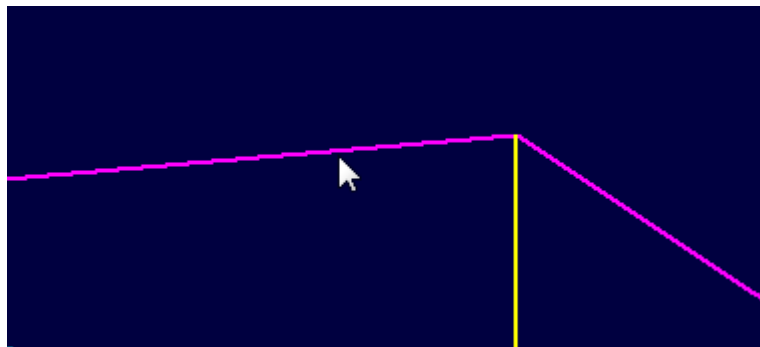
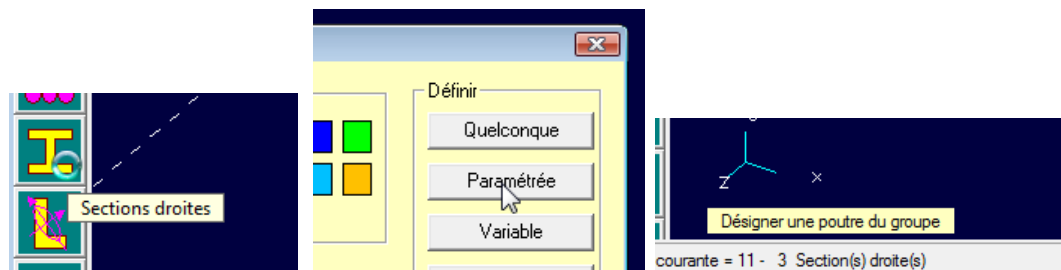
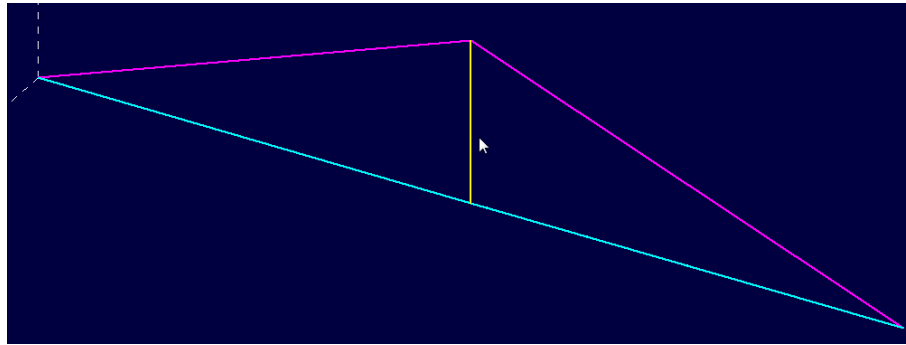
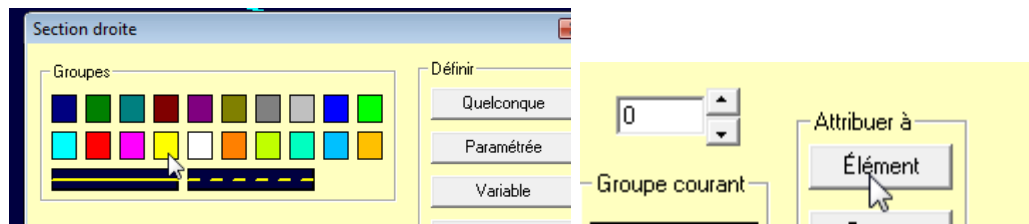
Le tablier du pont en rectangle : y10 x z50 mm

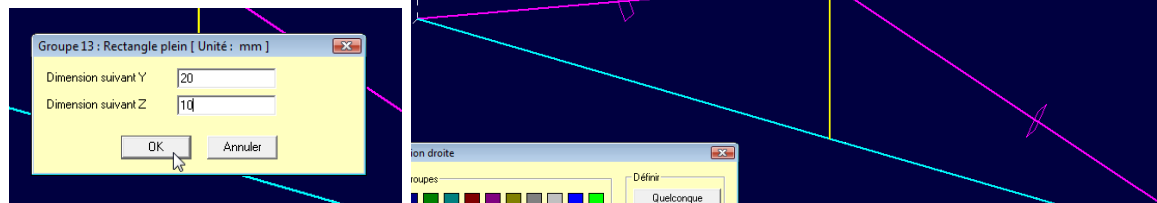
Les barres en biais en rectangle : y20 x z10 mm

La barre verticale en rond : de diamètre 2mm

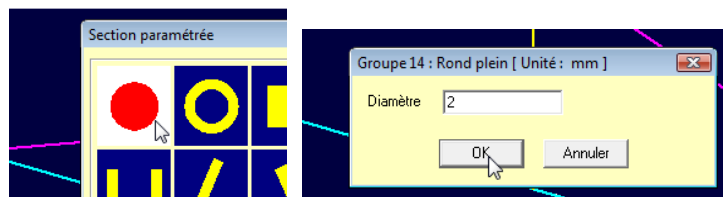
Il faut donc affecter des couleurs différentes aux éléments afin d'attribuer les sections adaptées.



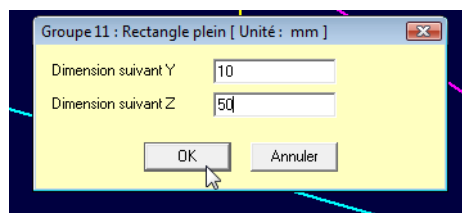




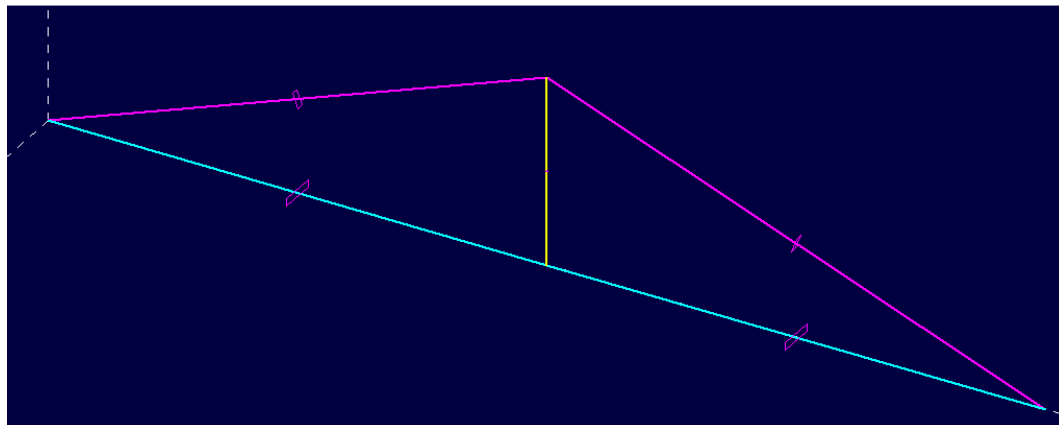
Recommencer pour la barre verticale :



Et pour le tablier :



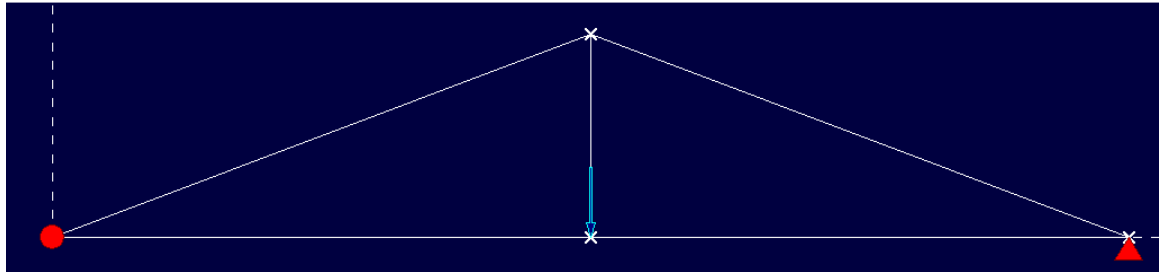
Résultat :



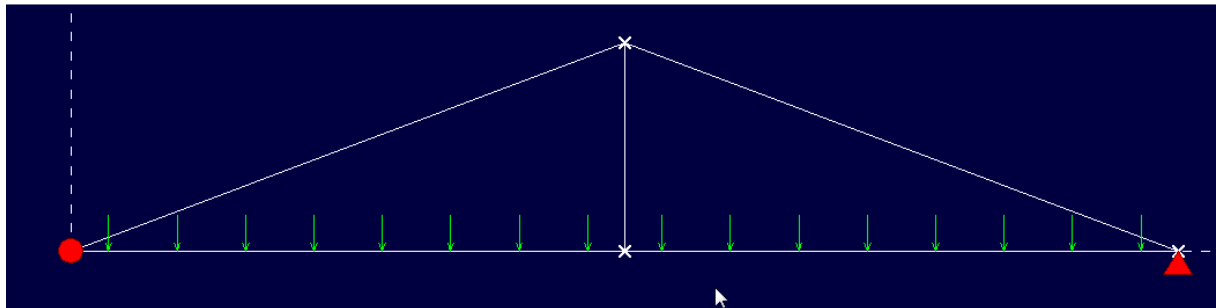
Chargement :

On distinguera 2 cas :

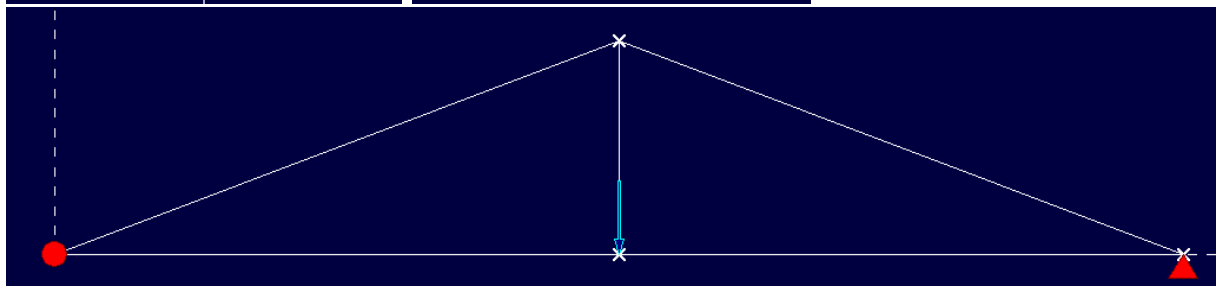
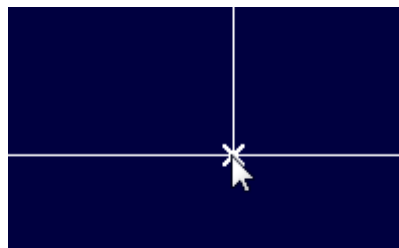
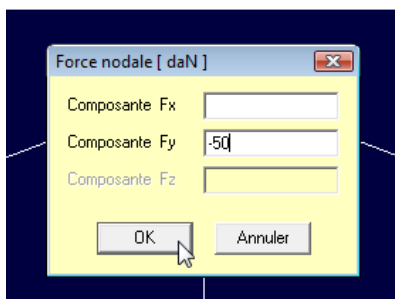
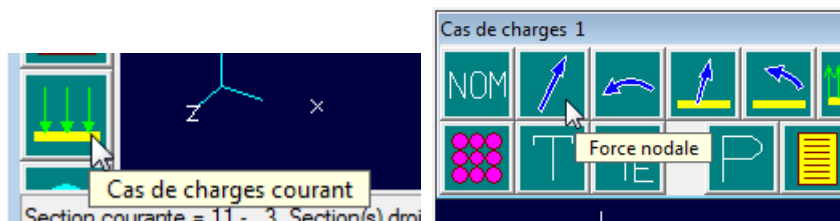
Cas 1 : charge concentrée égale à 50 daN au centre du tablier : Nœud 2



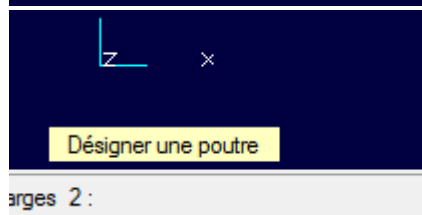
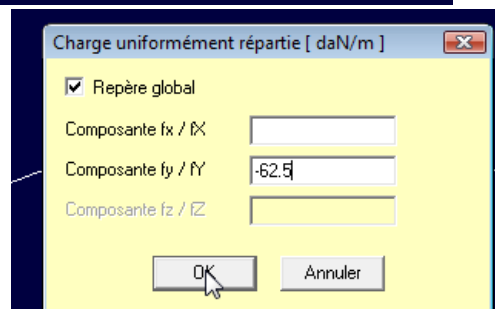
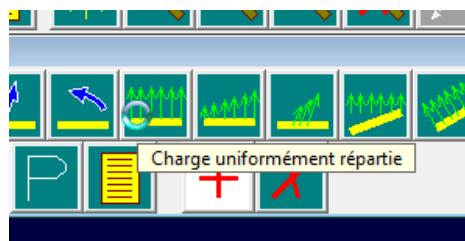
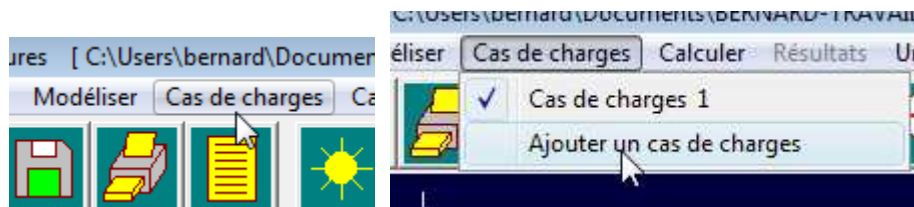
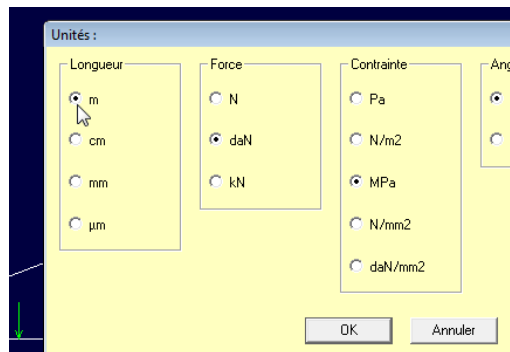
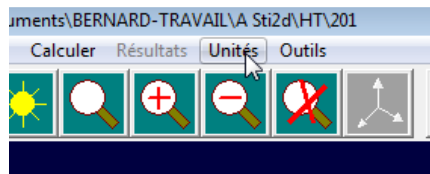
Cas 2 : charge uniformément répartie sur le tablier égale à 62.5 daN/m (voir équivalence avec cas1)



Cas 1 :

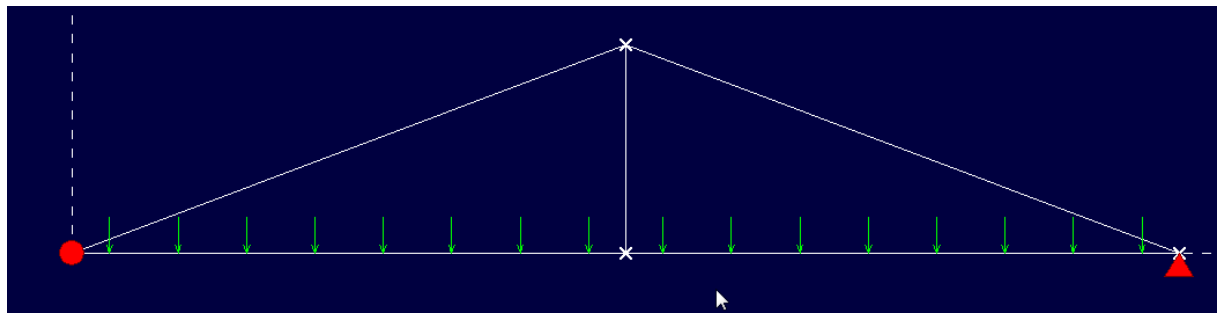


Cas 2 :



arges 2 :





Calcul :

