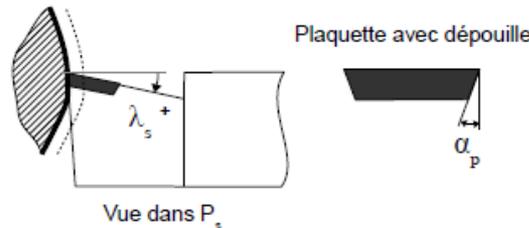
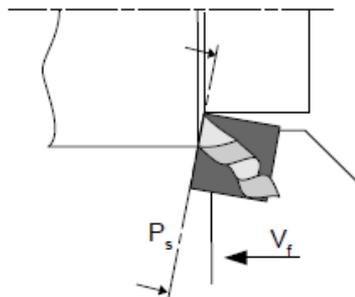
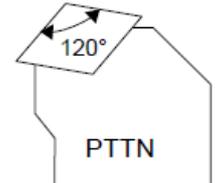
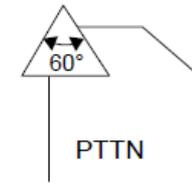
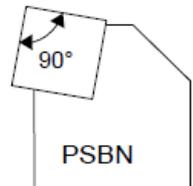
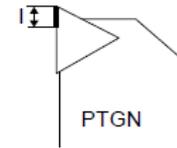
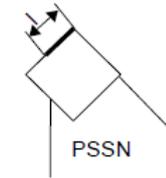
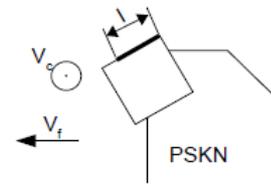
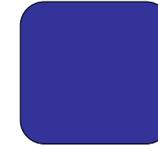


Angles caractéristiques des outils

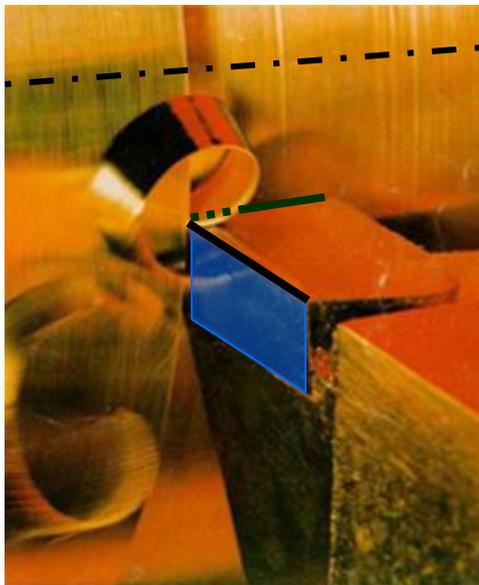
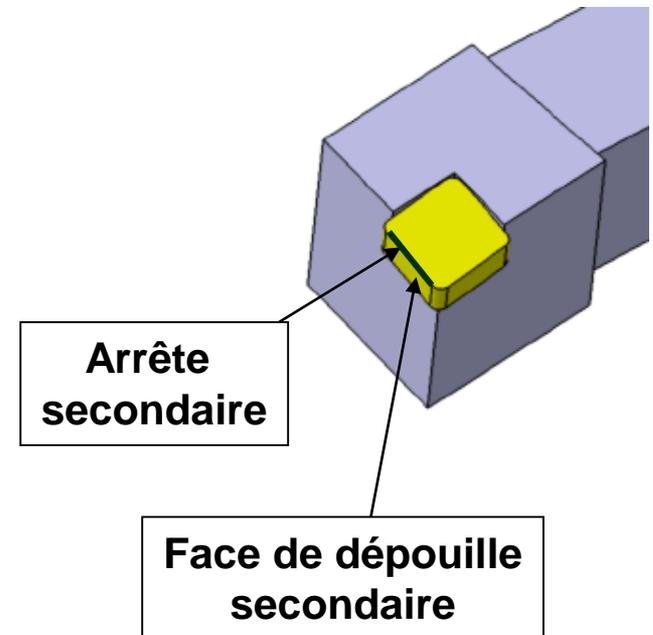
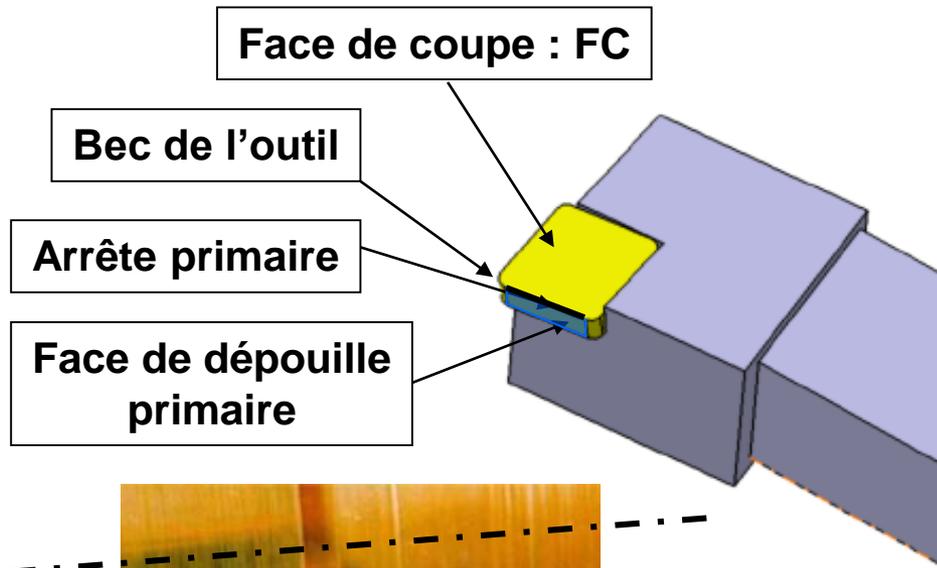
➤ **Pourquoi connaître ces angles ?**

➤ **Car ils influent sur :**

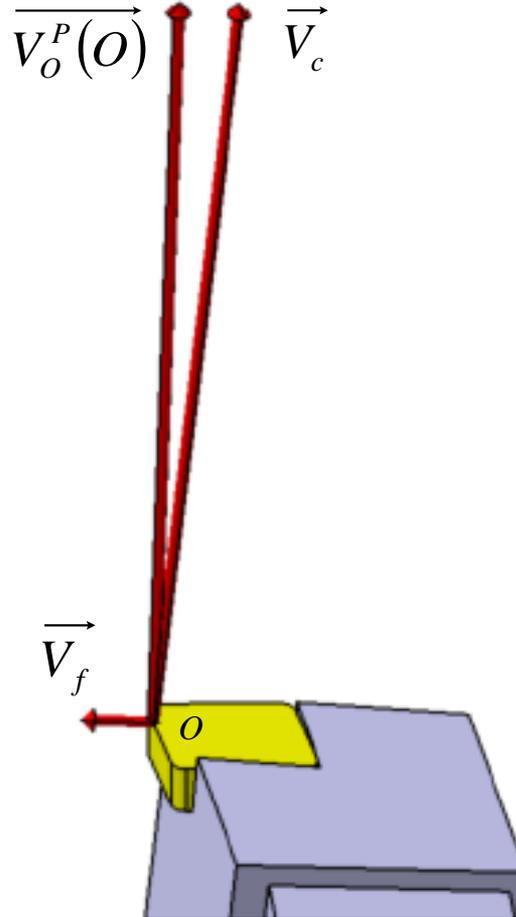
- ❑ la longueur d'arête en travail
- ❑ l'entrée en matière en début de passe
- ❑ la sortie de passe
- ❑ la fragilité en pointe de l'outil
- ❑ la direction de dégagement du copeau
- ❑ la robustesse et la réversibilité de la plaquette



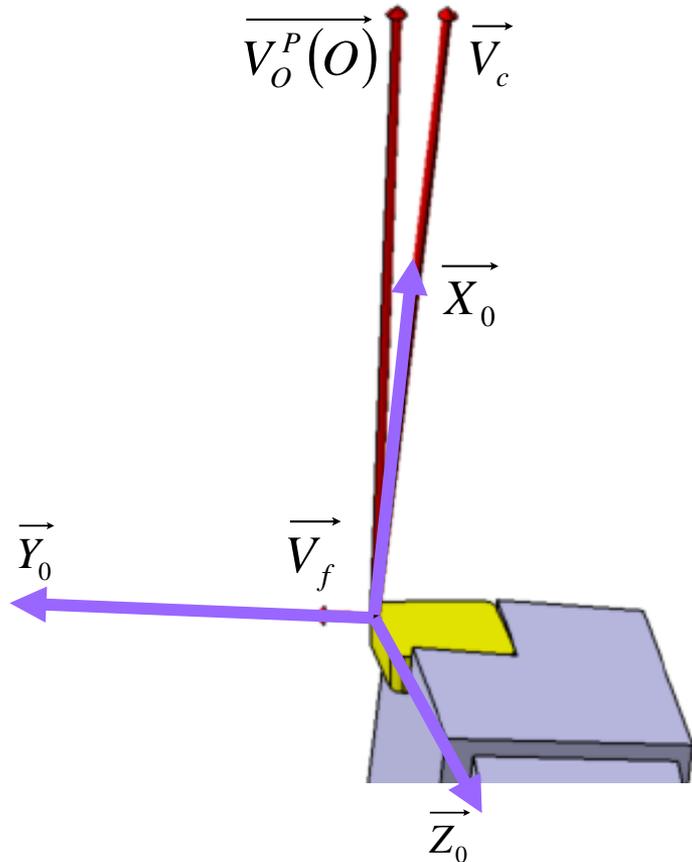
Angles caractéristiques des outils



Angles caractéristiques des outils



Angles caractéristiques des outils

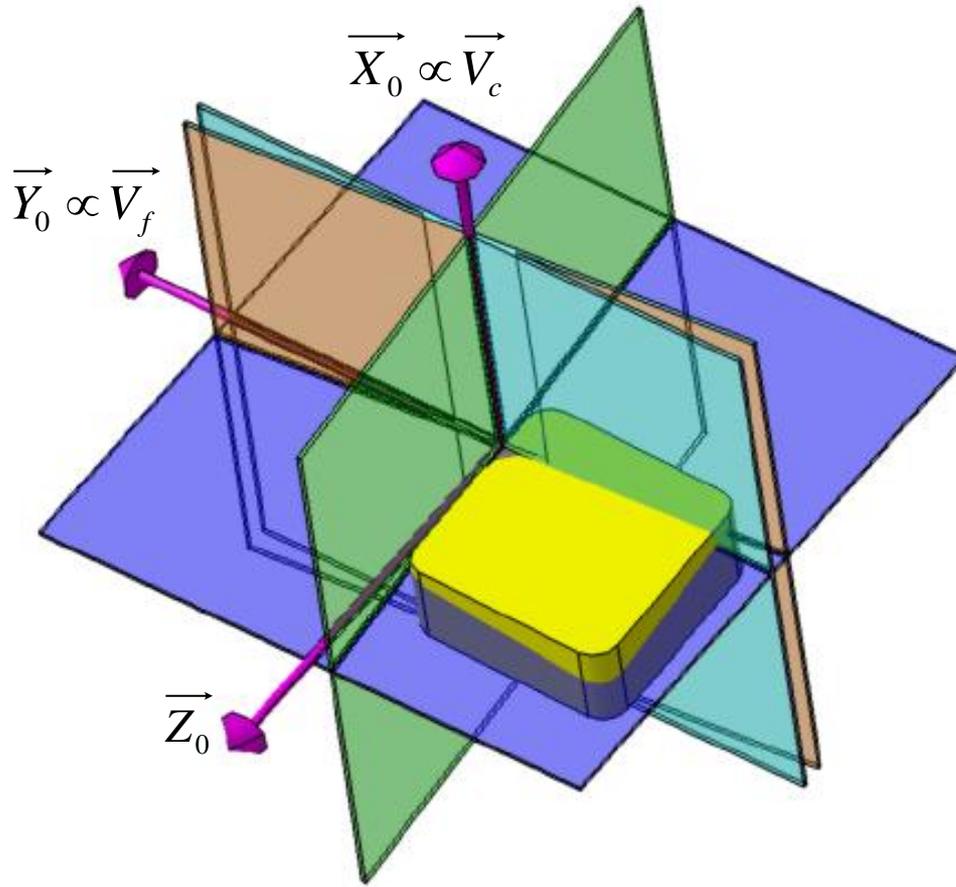


$$\vec{X}_0 = \frac{\vec{V}_c}{\|\vec{V}_c\|}$$

$$\vec{Y}_0 = \frac{\vec{V}_f}{\|\vec{V}_f\|}$$

$(O, \vec{X}_0, \vec{Y}_0, \vec{Z}_0)$ repère orthonormé direct

Angles caractéristiques des outils



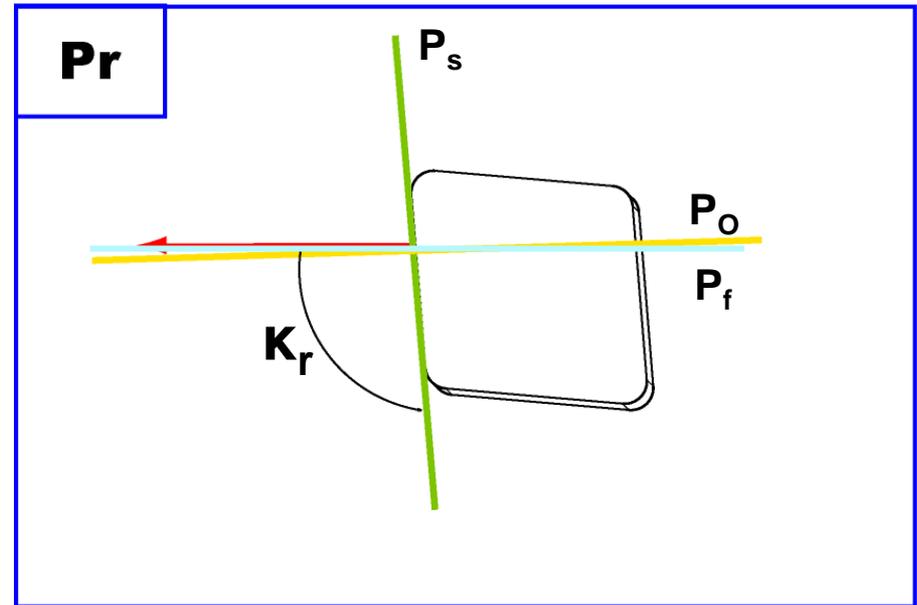
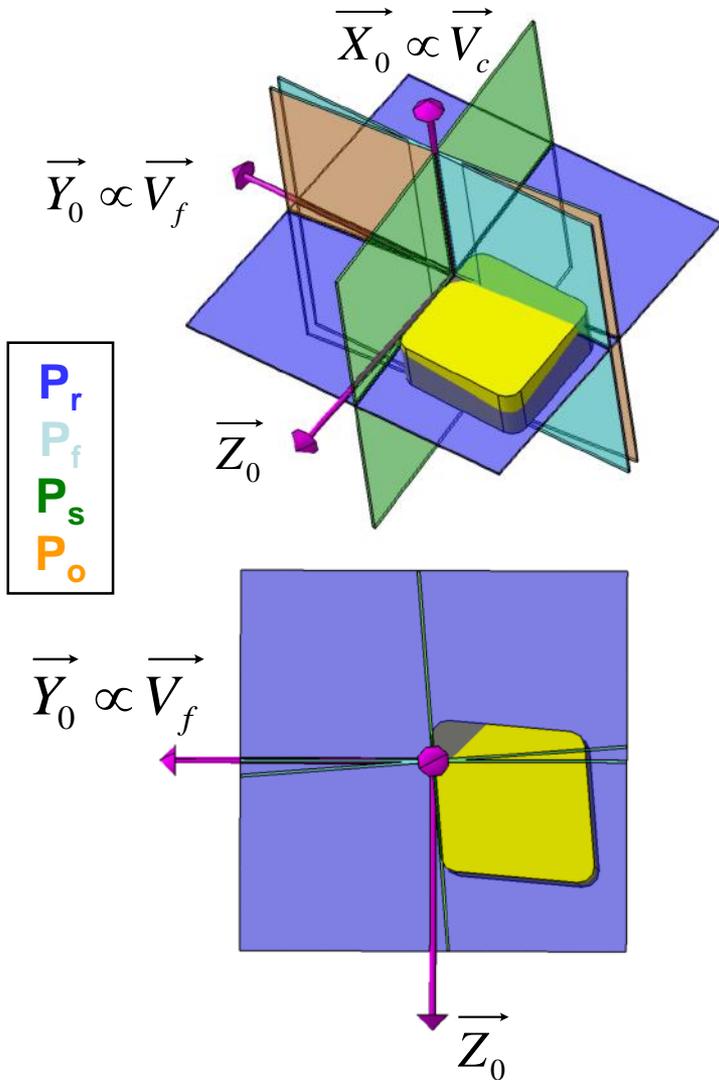
P_r : Plan de référence
 $P_r = (O, Y_0, Z_0)$; orthogonal à X_0

P_f : Plan de travail
 $P_f = (O, X_0, Y_0)$; orthogonal à Z_0

P_s : Plan d'arête
 P_s orthogonal à P_r , contenant l'arête primaire et passant par O .

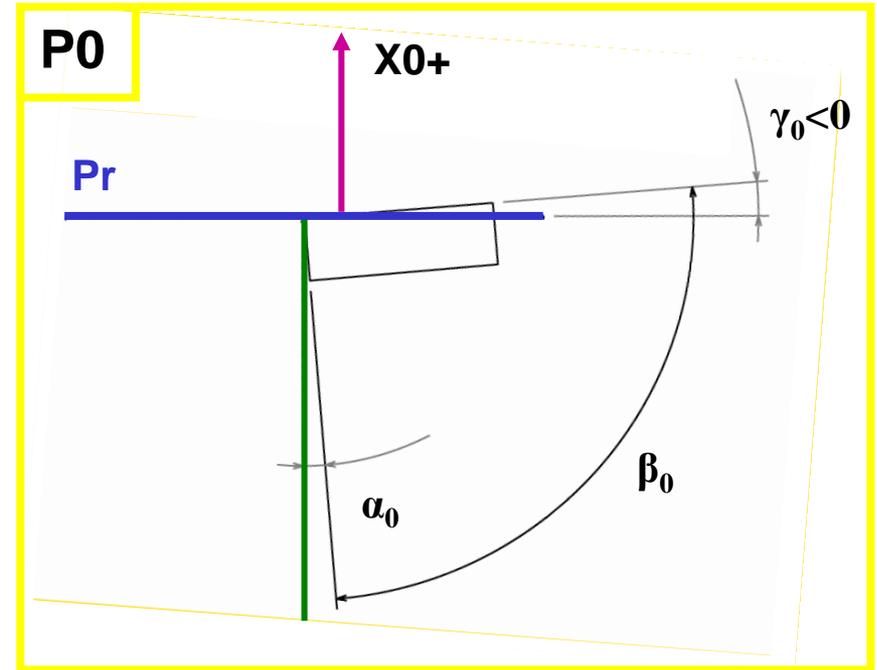
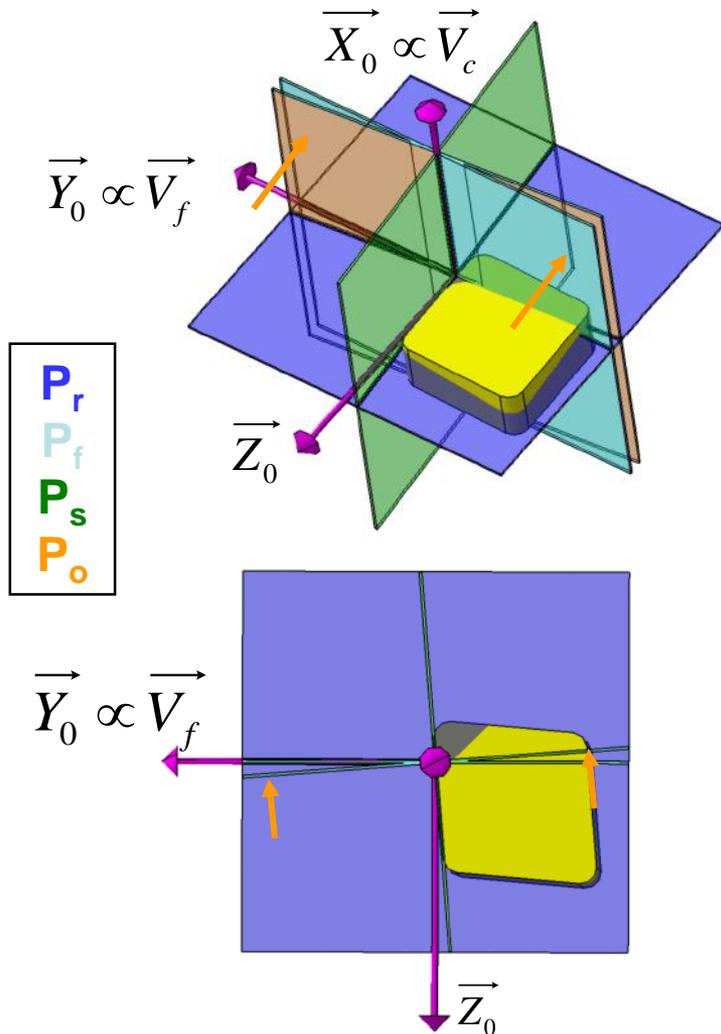
P_0 :
Plan orthogonal à P_r et P_s , passant par O

Angles caractéristiques des outils



Angle κ_r : direction d'arête, mesuré entre le plan de travail P_f et le plan d'arête P_s

Angles caractéristiques des outils



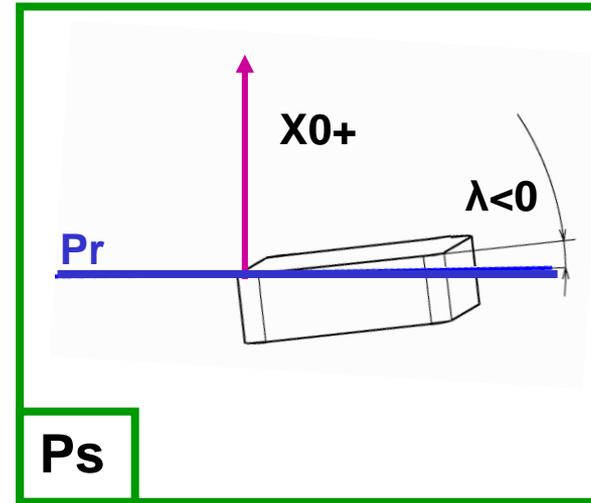
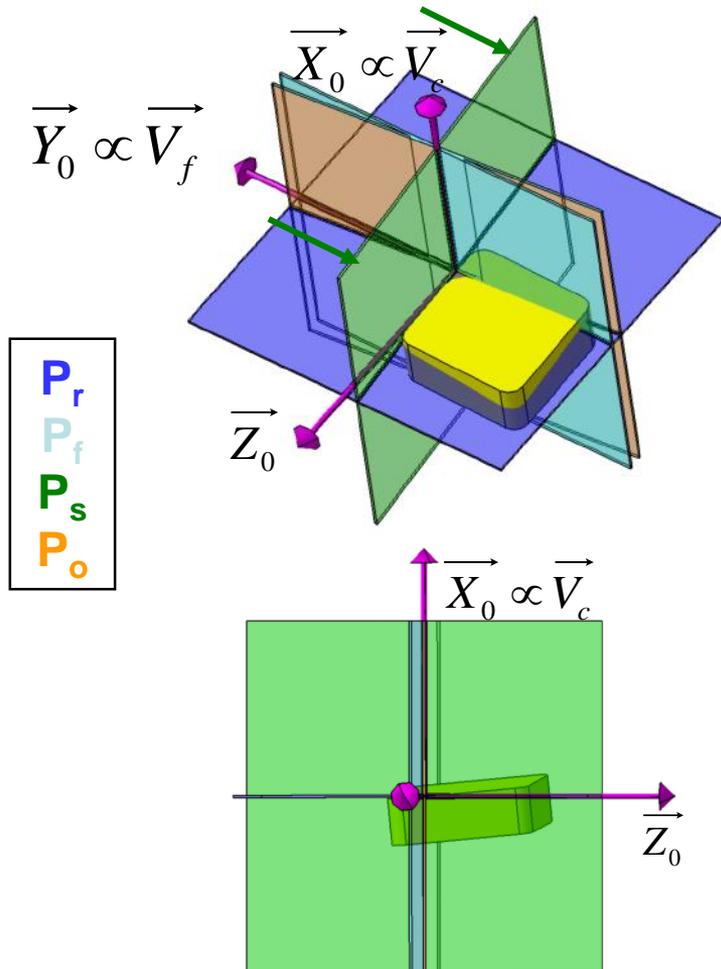
Angle γ_0 : angle de coupe (< 0 si FC vers X_{0+} et inversement)

Angle α_0 : angle de dépouille

Angle β_0 : angle de taillant

$$\alpha + \beta + \gamma = 90^\circ$$

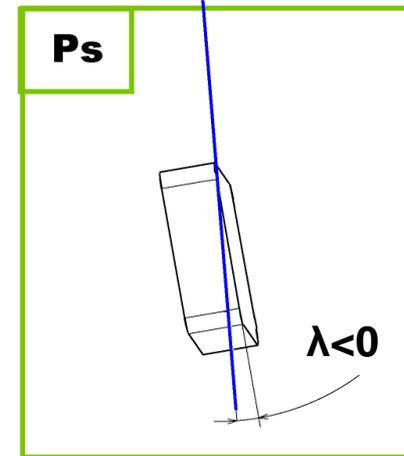
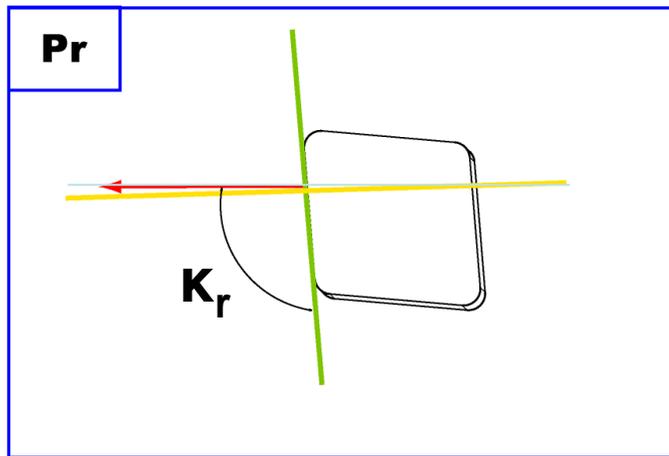
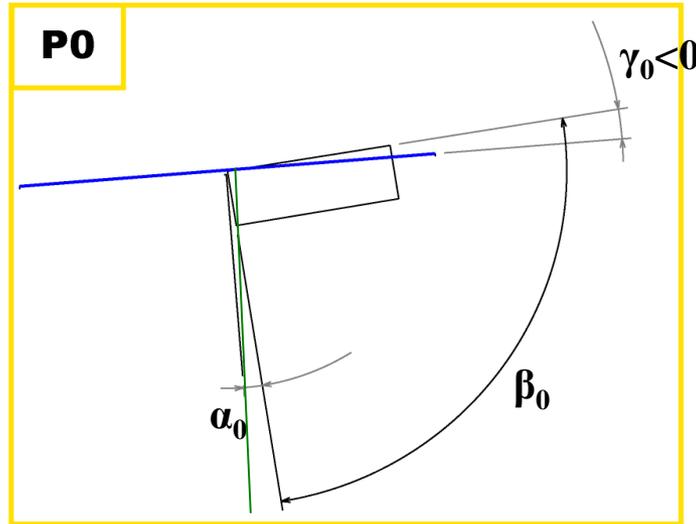
Angles caractéristiques des outils



Angle λ : inclinaison d'arête
(> 0 si F_c vers X_{0-} et inversement)

Angles caractéristiques des outils

P_r
 P_f
 P_s
 P_o

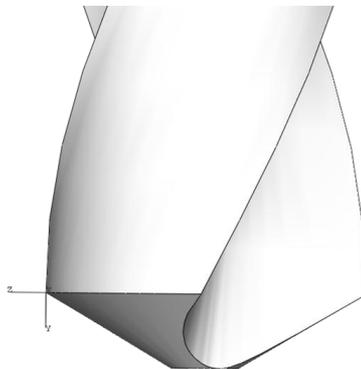
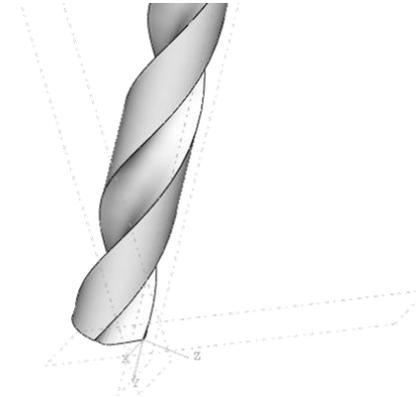
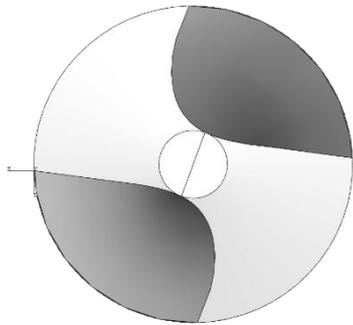


Angles caractéristiques des outils - Méthodologie

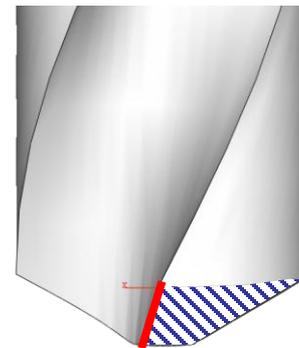
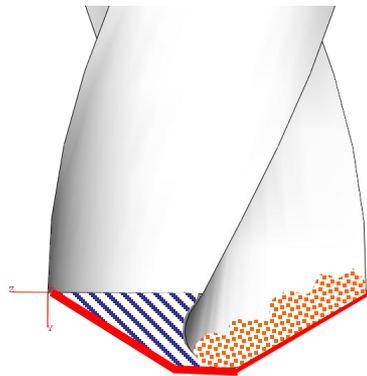
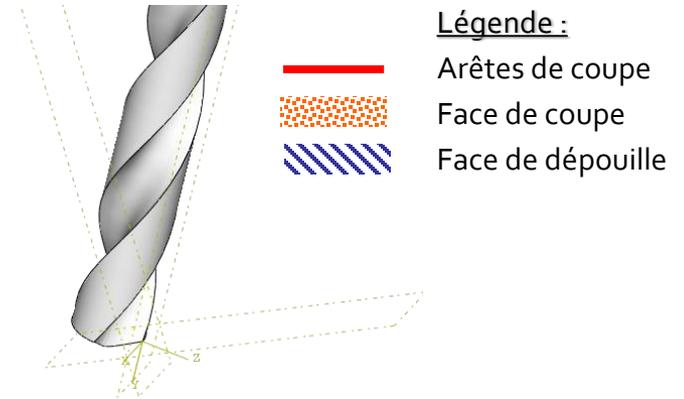
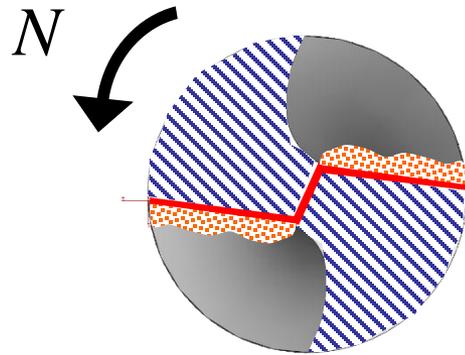
➤ **Détermination des angles de coupe outil en main**

- ❑ Spécifier la face de coupe, face de dépouille et arête de coupe
- ❑ Déterminer les vecteurs V_c et V_f en un point O de l'arête de coupe
- ❑ Associer un repère (O, X_0, Y_0, Z_0)
- ❑ Identifier les plans de l'outil (en main) P_r , P_f , P_o et P_s
 - { $P_r \perp V_c$ }
 - { $P_f \equiv (V_f, V_c)$ }
 - { P_s contient l'arête et $\perp P_r$ }
 - { $P_o \perp P_r$ et P_s }
- ❑ Projeter la plaquette dans ces plans pour identifier les angles de coupe
 - $P_r \rightarrow$ angle de direction d'arête (κ)
 - $P_o \rightarrow$ angle des face ($\alpha_o, \beta_o, \gamma_o$)
 - $P_s \rightarrow$ angle d'inclinaison d'arête (λ)

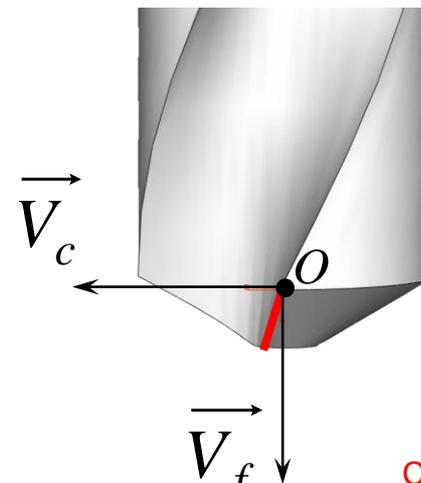
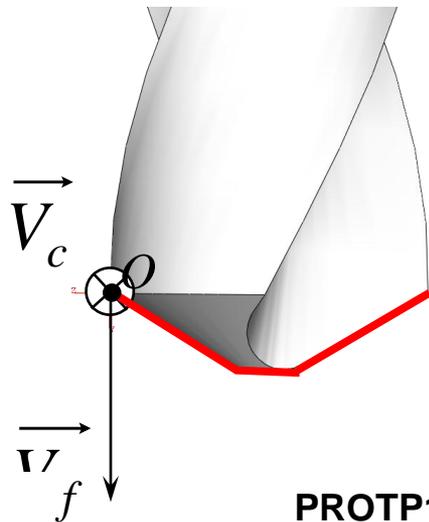
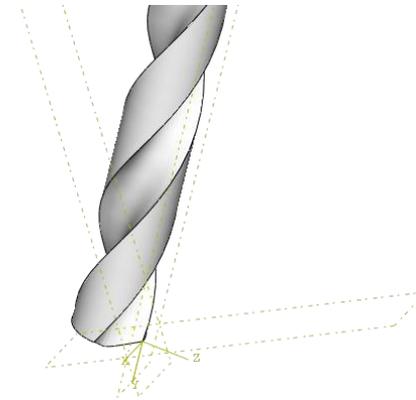
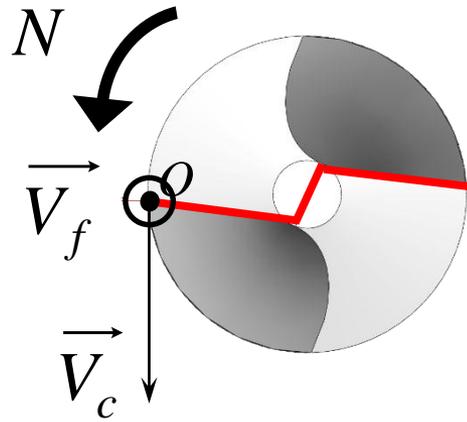
Exercice 2



Identification des arêtes de coupe et faces

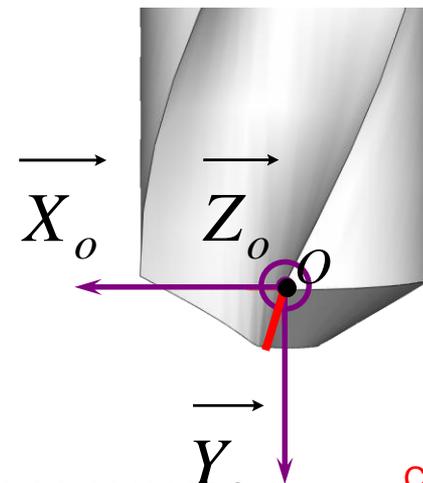
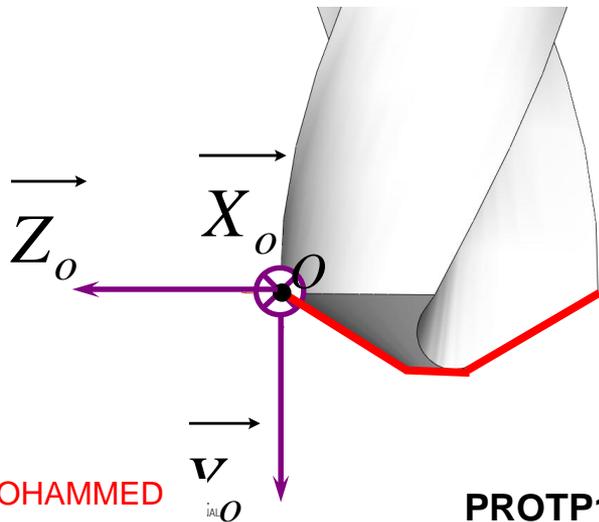
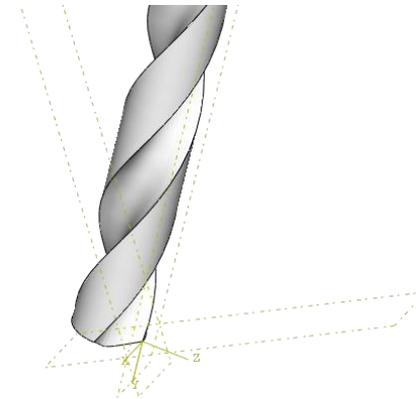
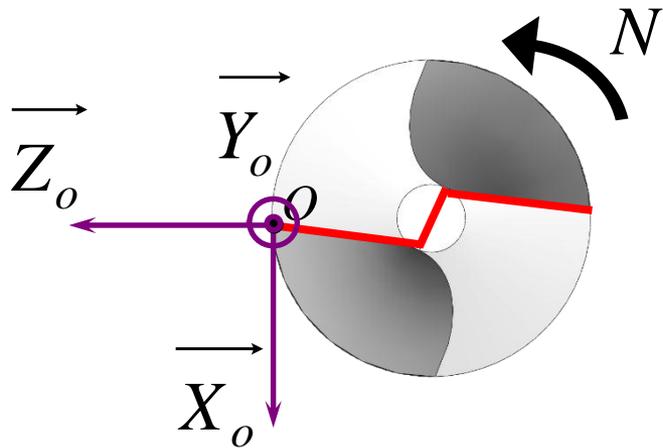


Détermination de V_c et V_f en O

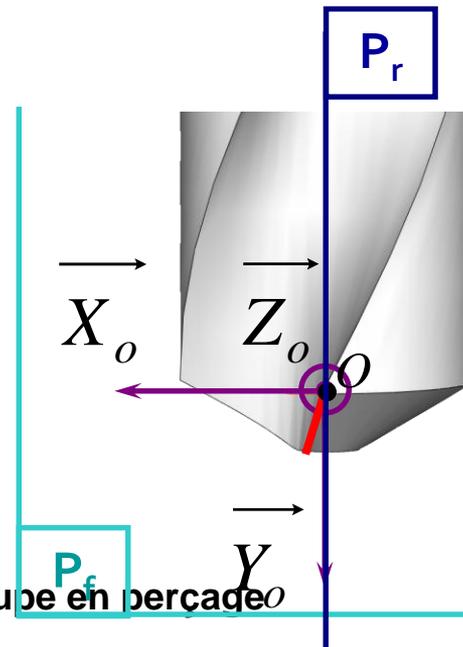
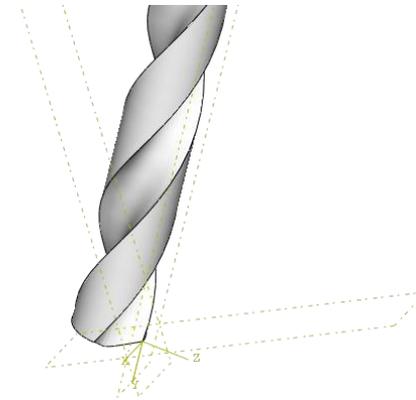
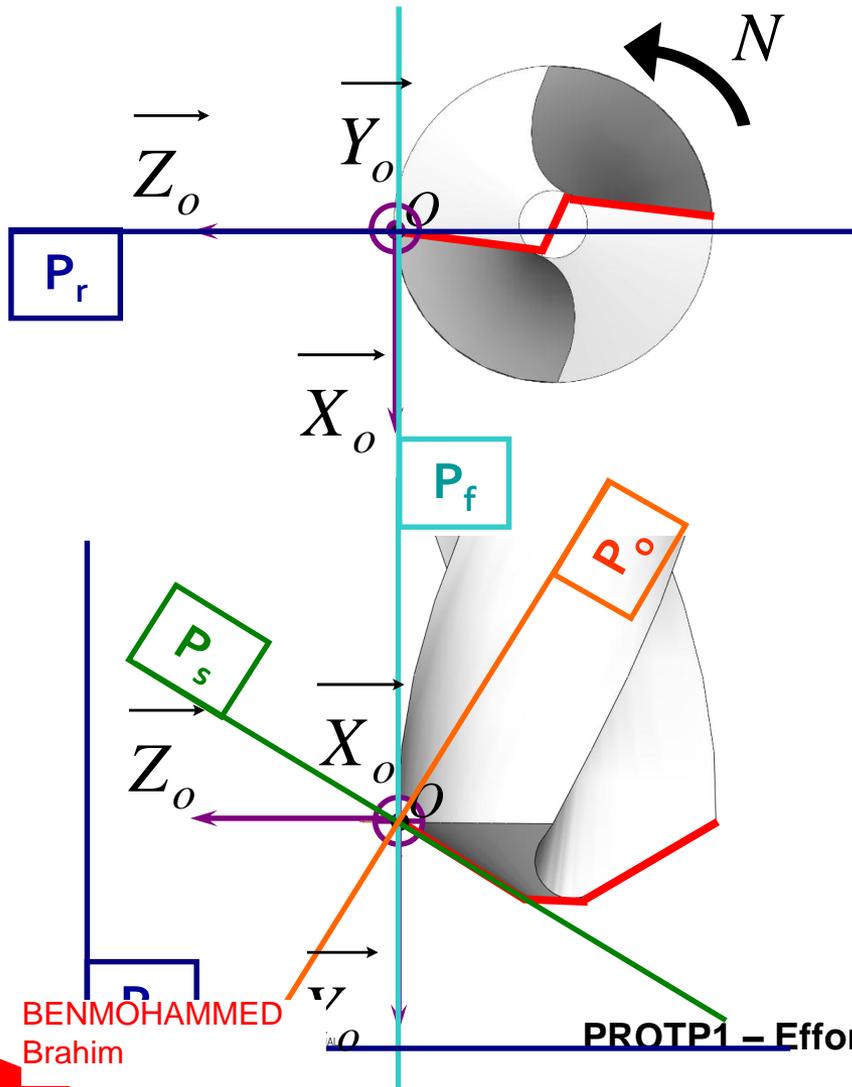


PROTP1 – Efforts de coupe en perçage f

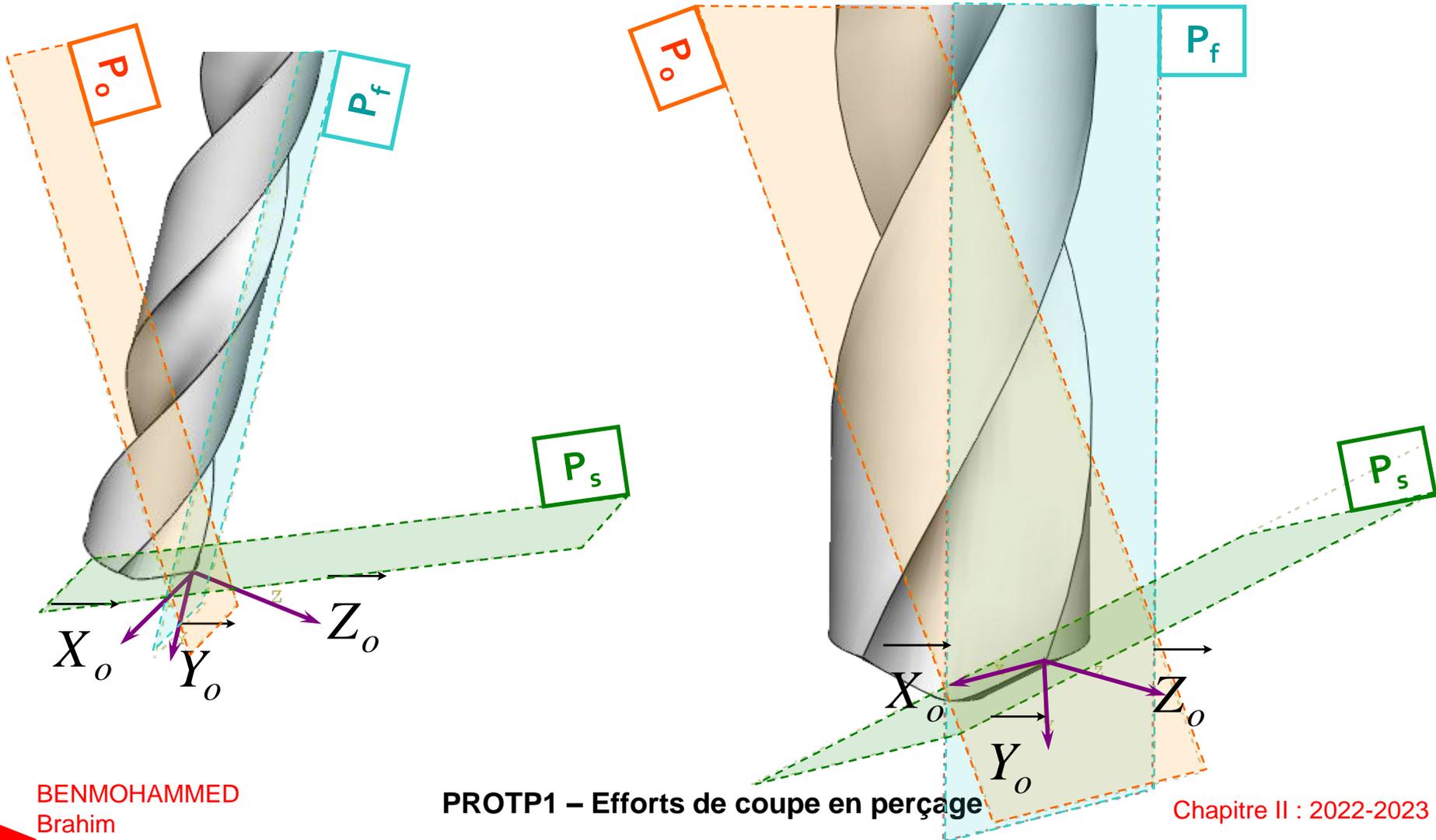
Construction du repère (O, X_0, Y_0, Z_0)



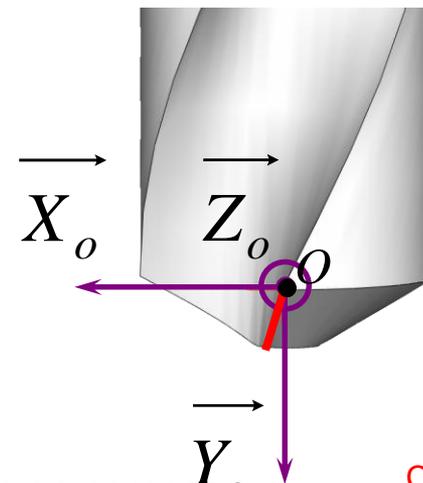
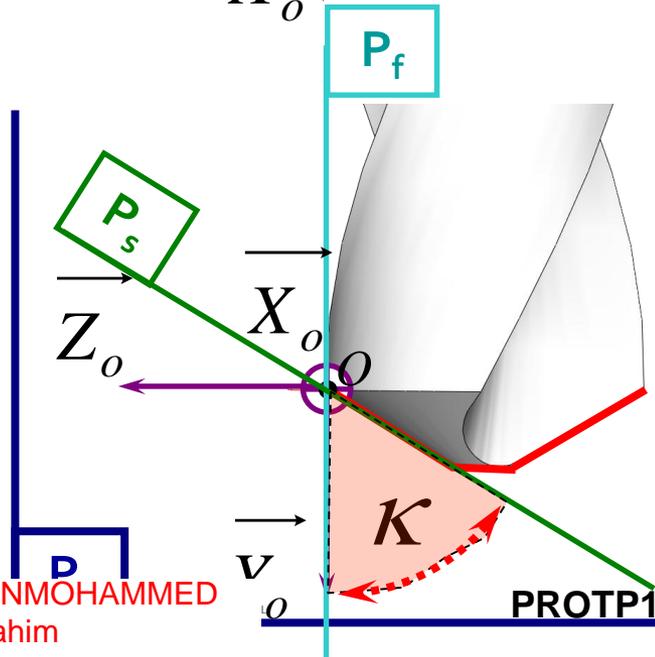
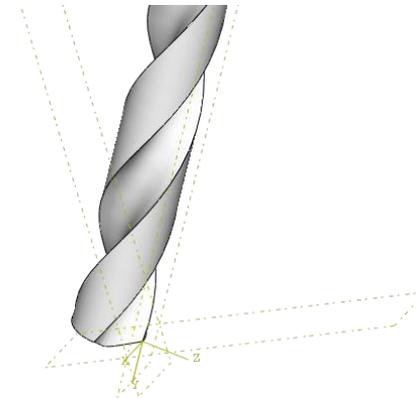
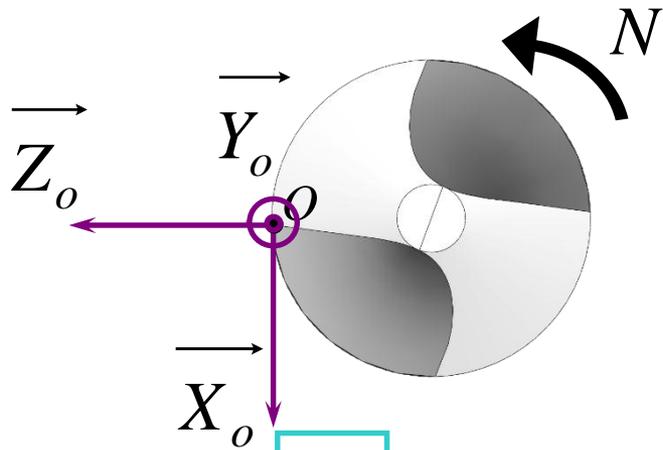
Tracé des plans P_r , P_f , P_s et P_o



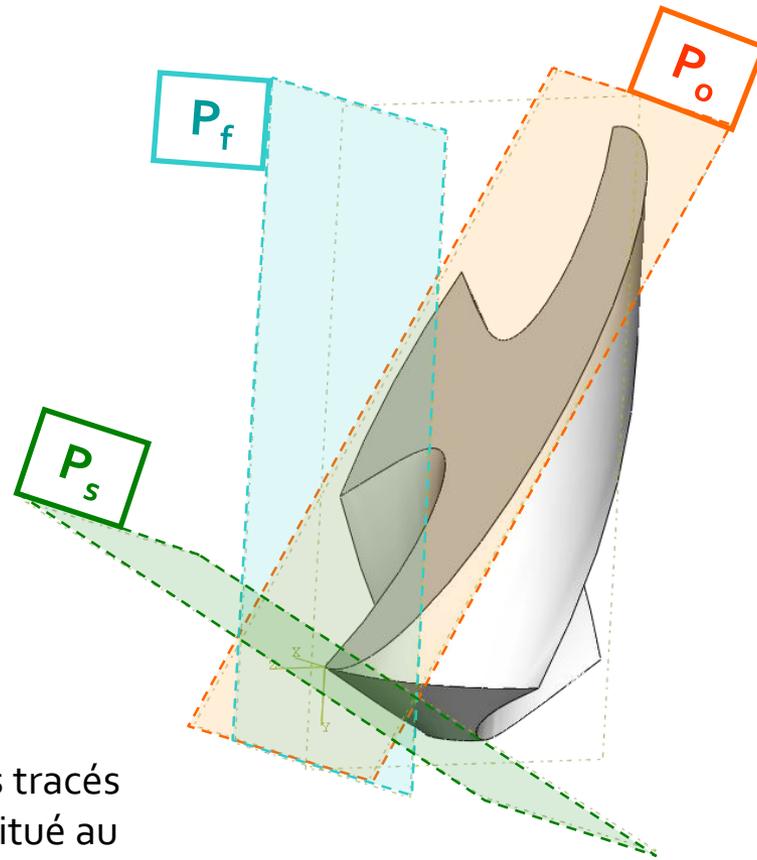
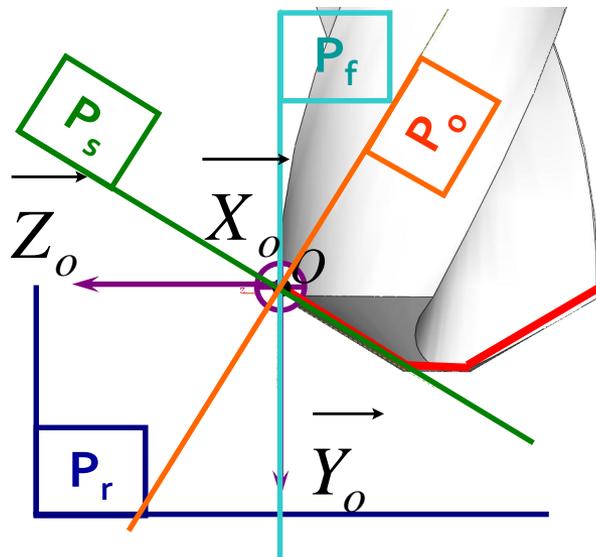
Visualisation des plans P_f , P_s et P_o



Détermination de l'angle κ dans P_r

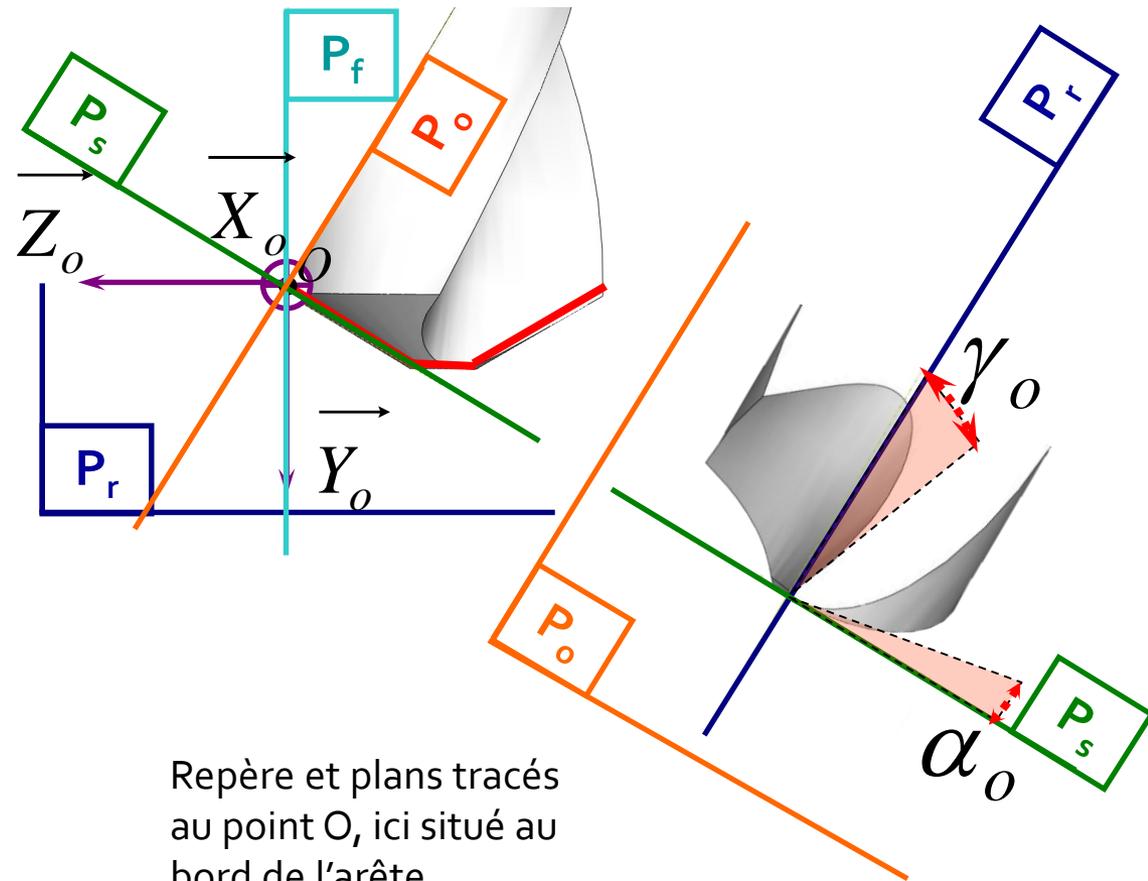
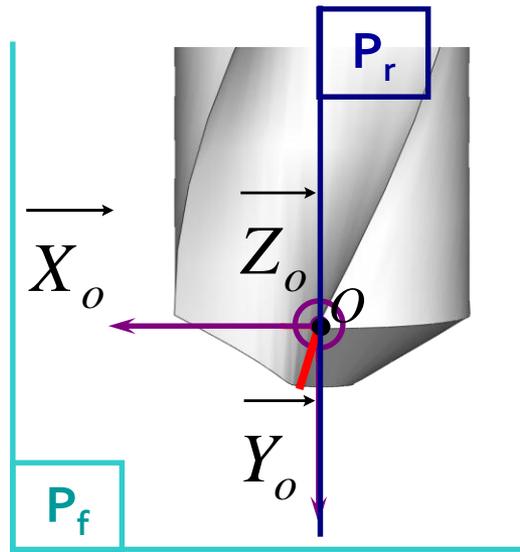


Angles α et γ dans P_o au point O



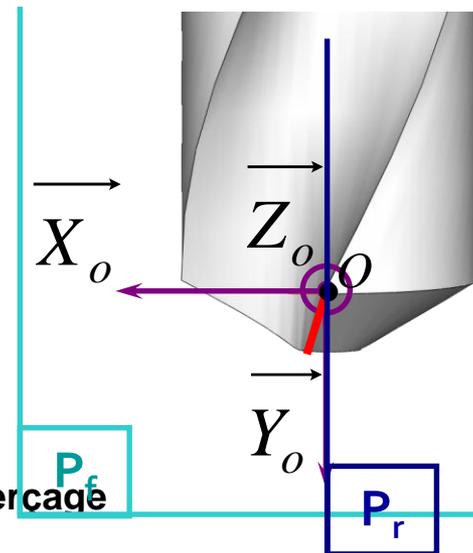
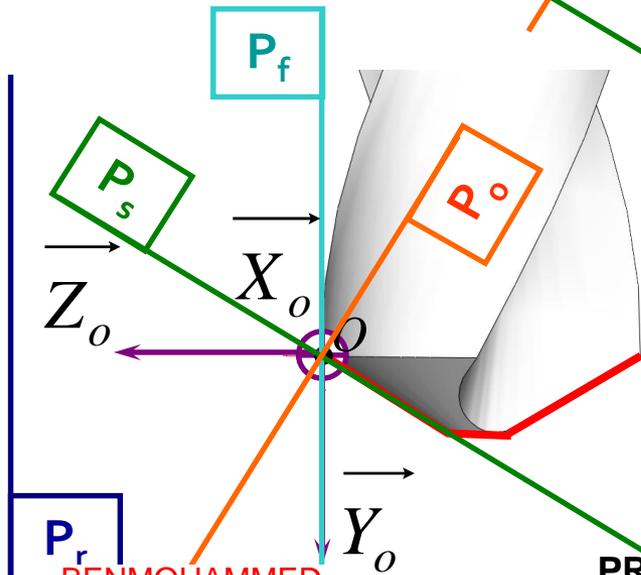
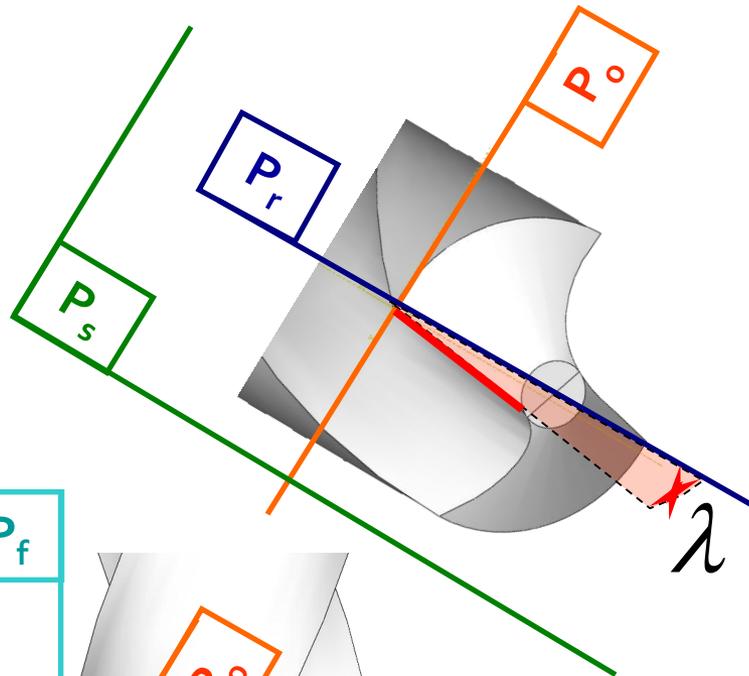
Repère et plans tracés
au point O, ici situé au
bord de l'arête

Angles α et γ dans P_o au point O



Repère et plans tracés
au point O, ici situé au
bord de l'arête

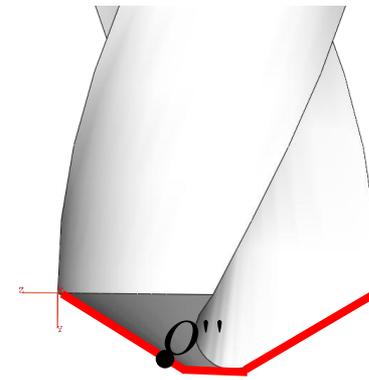
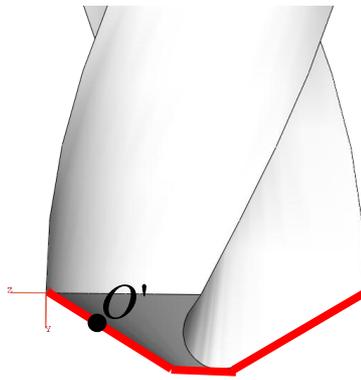
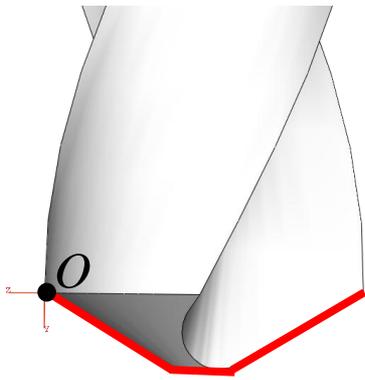
Angle λ dans P_s



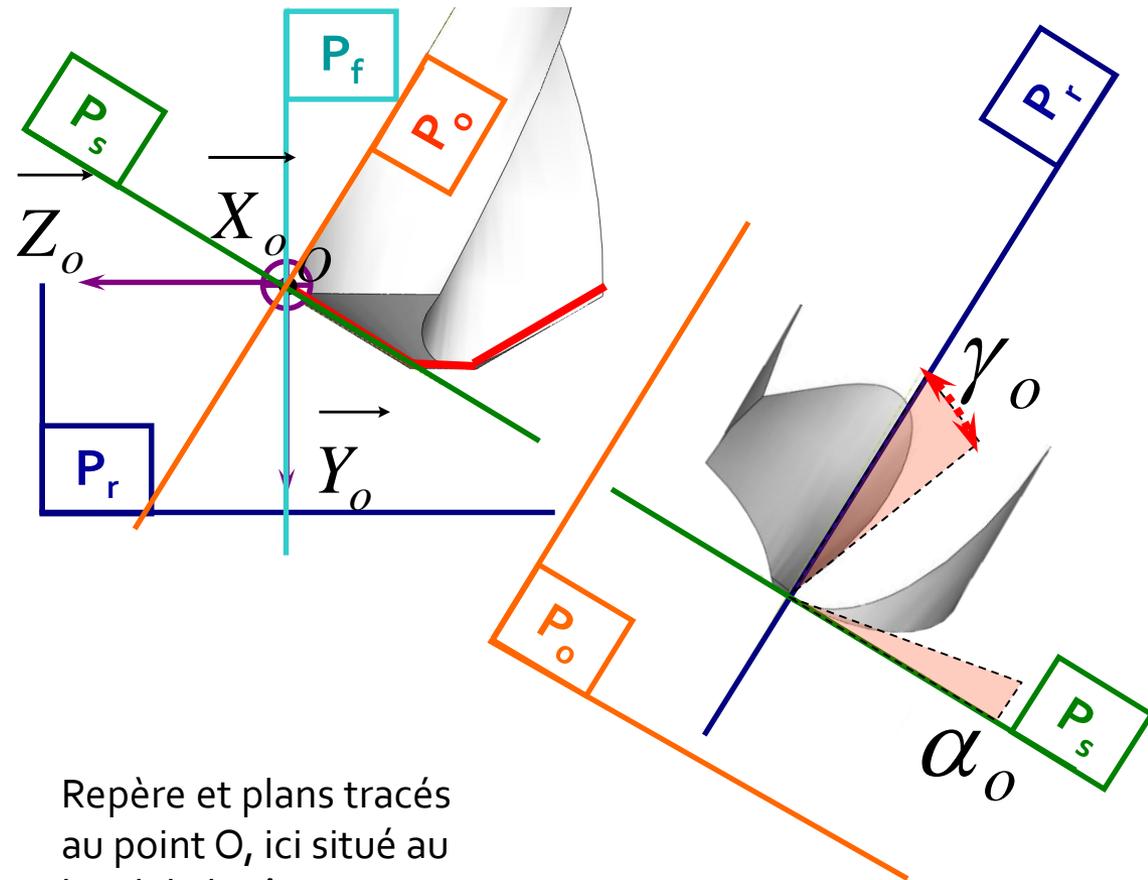
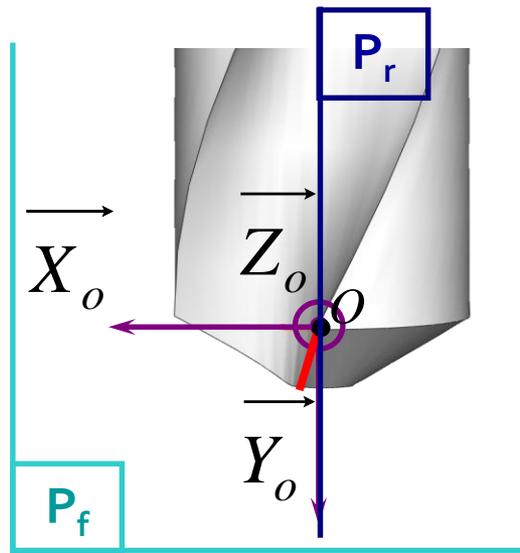
PROTP1 – Efforts de coupe en perçage

Variation des angles en fonction de la position du point O

- Évolution des angles le long de l'arrêt de coupe

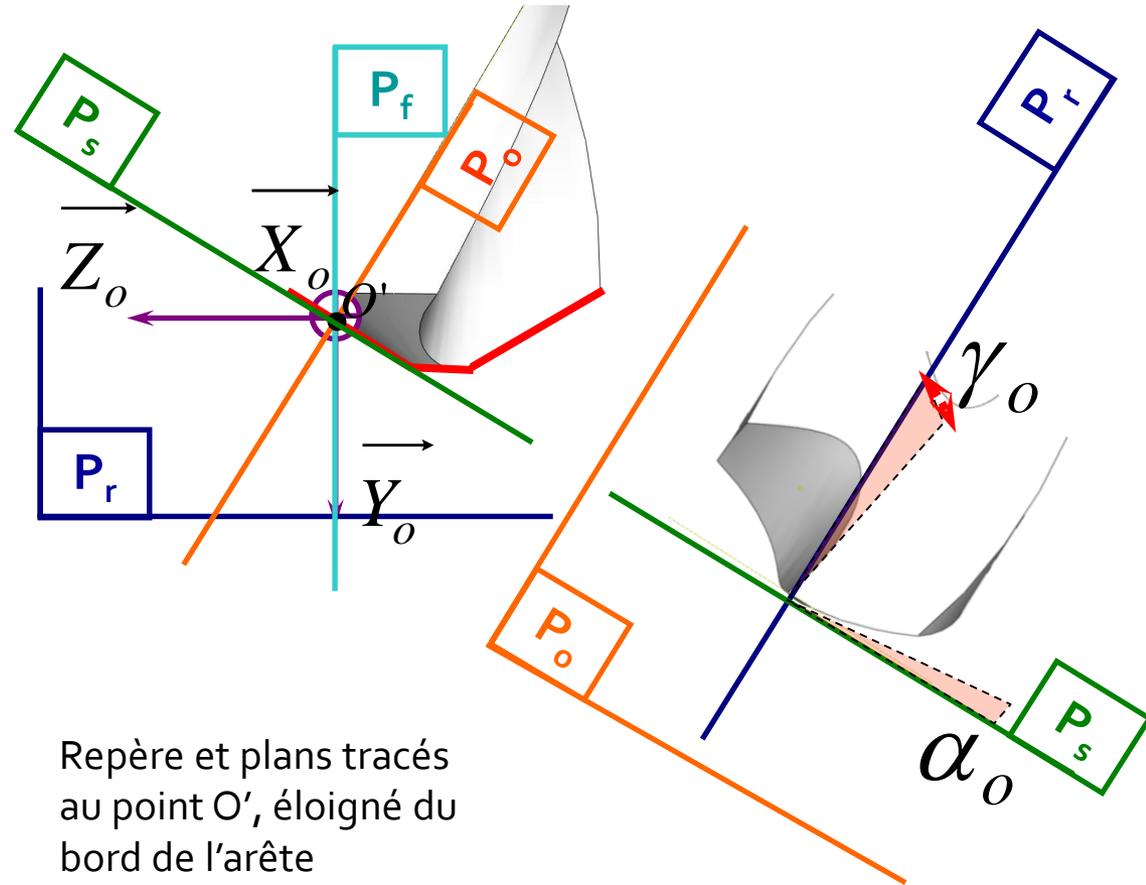
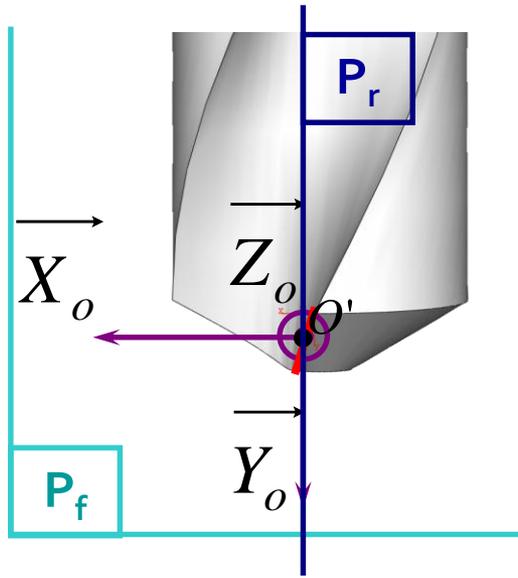


Angles α et γ dans P_o au point O

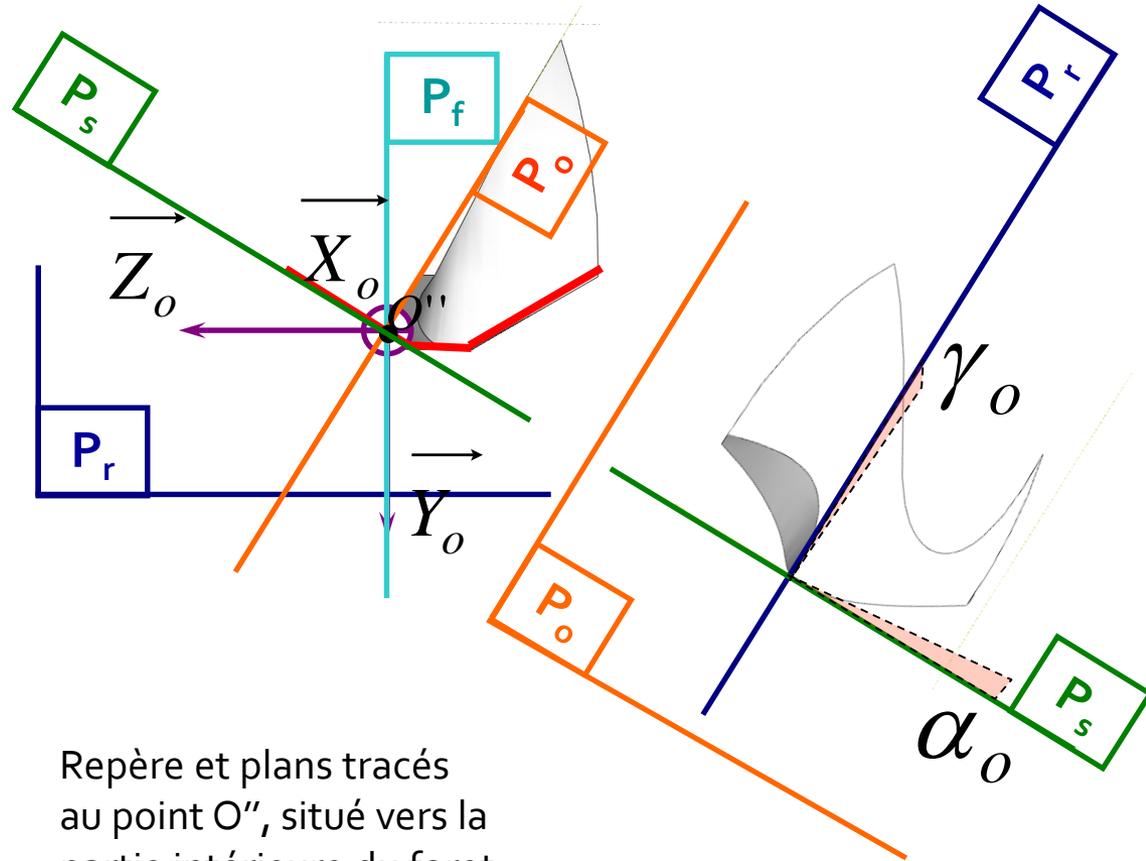
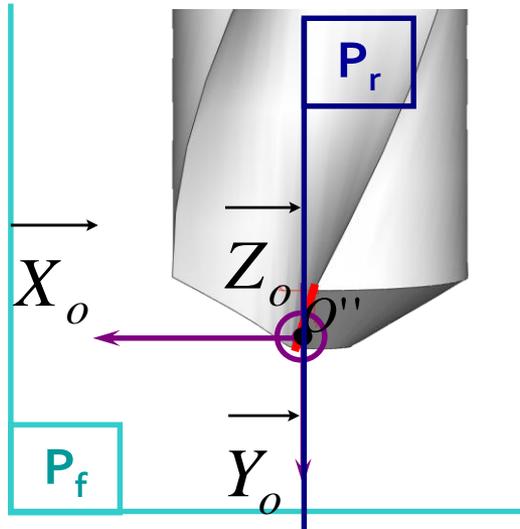


Repère et plans tracés
au point O, ici situé au
bord de l'arête

Angles α et γ dans P_o au point O'



Angles α et γ dans P_o au point O''



Repère et plans tracés
au point O'' , situé vers la
partie intérieure du foret