TopSolid Project

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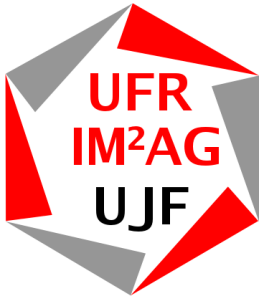

Plan

Figure : TopSolid Galaxy

- First CAD/CAM solution on PC's in the 80's.
  200 people, international resellers and around 25M of turnover.
- Field of activities :
  - General CAD/CAM : Design, assembly, mapping, cinematic. Turning, milling.
  - Tooling CAD/CAM : Mold, progressive, transfer and stamping die. Bending simulation.
  - Sheet metal CAD/CAM : Punching and cutting.

- Punch die.
- Blank holder.
- Metal strip.
- Die holder.

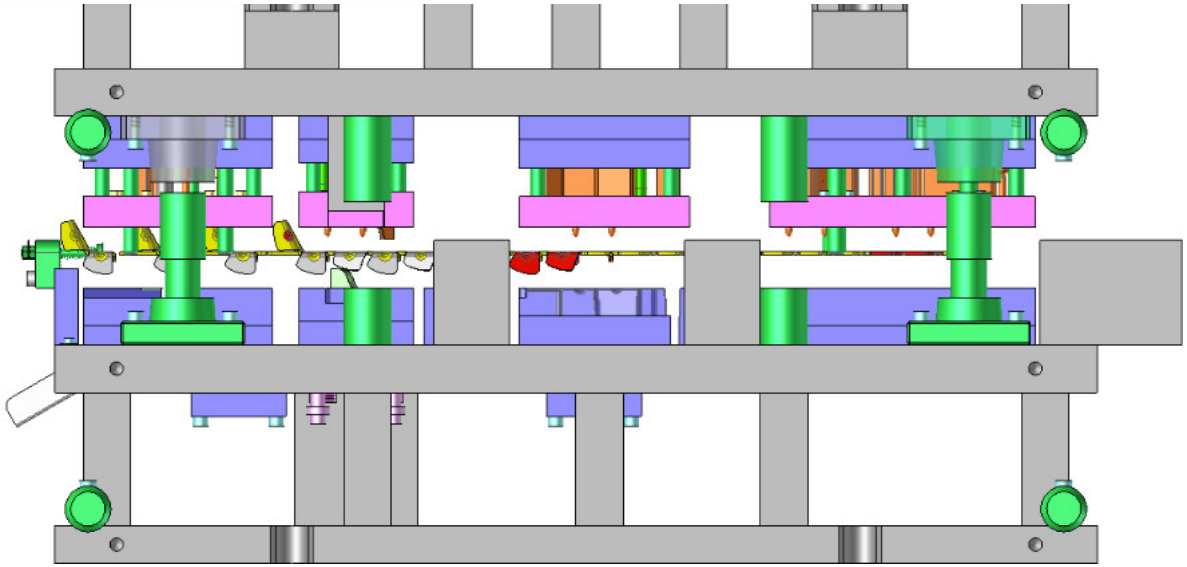

Figure : Progressive die tool

- Cutting :
  Takes some parts of the initial material off.
- Bending :
  Change the shape of the initial material by pushing it strongly.
- Stamping :
  ??????

Plan

Bending simulation

At the moment, there is no software embedding those two essential features :

- Compute non intuitive trajectories of the free parts of the metal sheet.
- Represent the spring back movement.

- Bending simulation.
- 2D representation.
- Sheet metal part geometry : constant thickness.
- Various punch die and punch holder shapes.
- Various material characteristics.

In a one operation cycle we will allow the user to :

- Visualize all the simulation steps.
- Visualize the trajectories of the free parts of the metal sheet.
- Visualize the distance between two points at a given step.
- Follow a given point over the time.

A 2D representation of :

- **A punch holder** : A polygon which does not move over the time.
- **A stripper** : A polygon that comes to fix a part of the metal sheet.
- **A punch die** : A polygon that we know the position over the time.
- **A metal sheet** : With its fixed thickness, it is described by its neutral axis with well known characteristics.

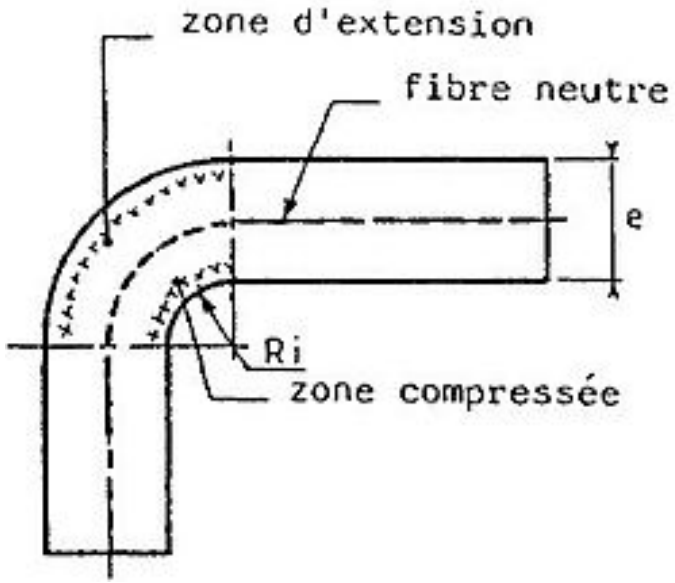

Figure : Neutral axis

Plan

Gantt diagram

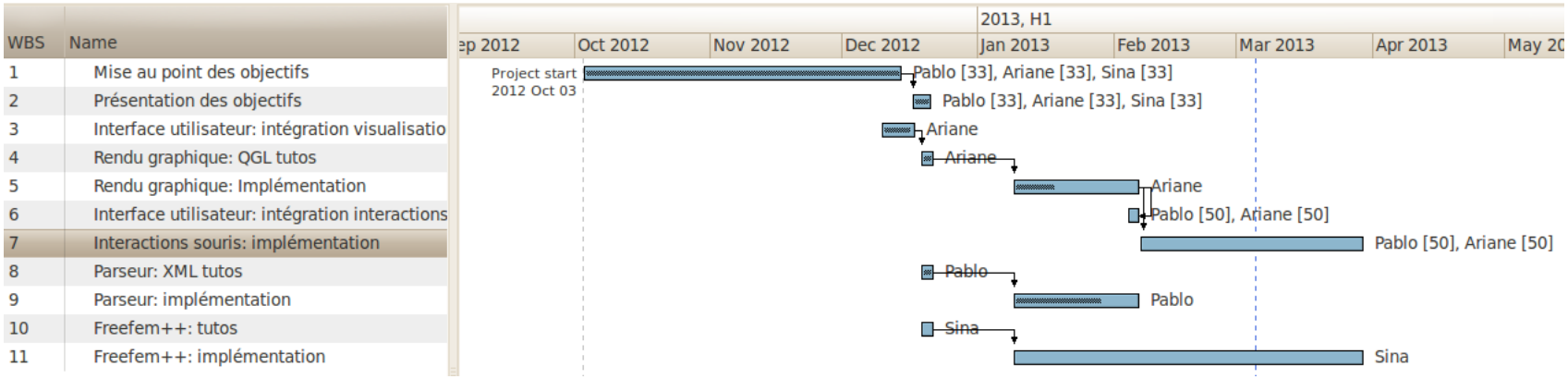

Figure : Diagramme de Gantt

- MCS : handles open fem
  Compute the metal sheet's deformation at every step.
- ICAO : visual rendering.
  Graphical user interface and interaction.
- ICAO : XML scene description and parser.
  Communication with open fem.

Tasks repartition

Name	Task
Miladi	
Miladi	Mise au point des objectifs
Miladi	Présentation des objectifs
Miladi	Freefem++: tutos
Miladi	Freefem++: implémentation
Lefebvre	
Lefebvre	Mise au point des objectifs
Lefebvre	Présentation des objectifs
Lefebvre	Interface utilisateur: intégration visualisation
Lefebvre	Rendu graphique: QGL tutos
Lefebvre	Rendu graphique: Implémentation
Lefebvre	Interface utilisateur: intégration interactions souris
Lefebvre	Interactions souris: implémentation
Coves	
Coves	Mise au point des objectifs
Coves	Présentation des objectifs
Coves	Interface utilisateur: intégration interactions souris
Coves	Interactions souris: implémentation
Coves	Parseur: XML tutos
Coves	Parseur: implémentation

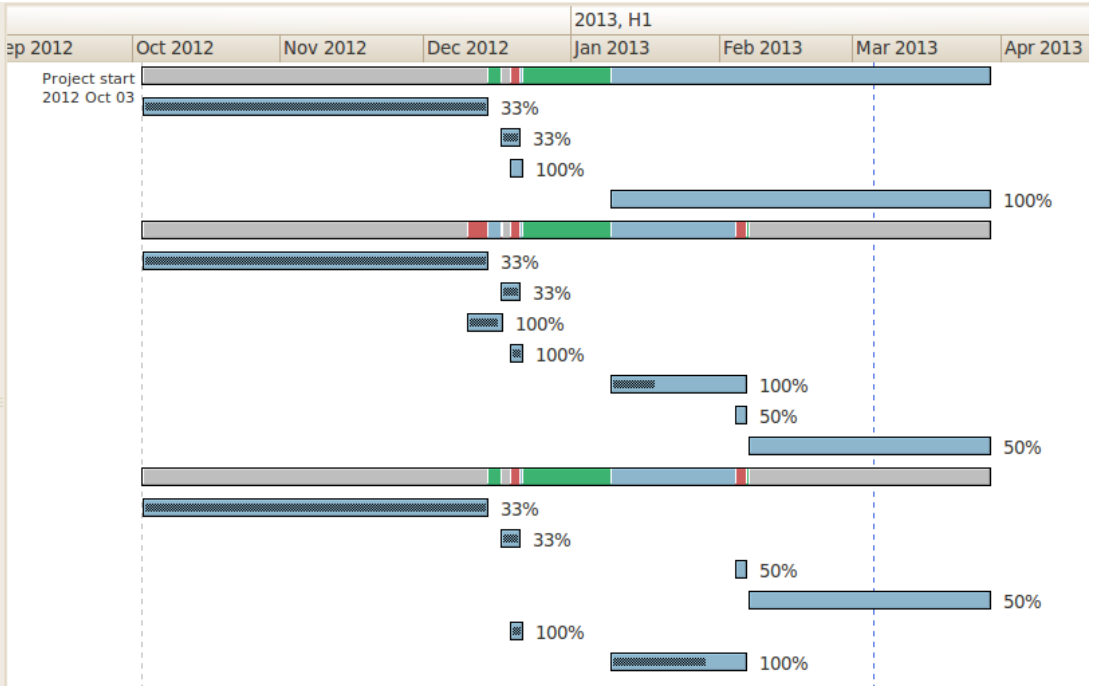

Figure : Tasks repartition

WBS	Name	Start	Finish	Work	Duration	Slack	Cost	Assigned to	% Complete
1	Mise au point des objectifs	Oct 3	Dec 14	52d	52d 3h	70d 3h	0	Pablo, Ariane, Sina	100
2	Présentation des objectifs	Dec 17	Dec 21	4d	4d	70d 6h	0	Pablo, Ariane, Sina	100
3	Interface utilisateur: intégration visualisation	Dec 10	Dec 17	6d	6d	13d	0	Ariane	90
4	Rendu graphique: QGL tutos	Dec 19	Dec 21	3d	3d	10d	0	Ariane	100
5	Rendu graphique: Implémentation	Jan 9	Feb 6	21d	21d		0	Ariane	33
6	Interface utilisateur: intégration interactions souris	Feb 4	Feb 6	3d	3d		0	Pablo, Ariane	0
7	Interactions souris: implémentation	Feb 7	Mar 29	37d	37d		0	Pablo, Ariane	0
8	Parseur: XML tutos	Dec 19	Dec 21	3d	3d	49d	0	Pablo	100
9	Parseur: implémentation	Jan 9	Feb 6	21d	21d	37d	0	Pablo	70
10	Freefem++: tutos	Dec 19	Dec 21	3d	3d	12d	0	Sina	0
11	Freefem++: implémentation	Jan 9	Mar 29	58d	58d		0	Sina	0

Figure : Tasks completion

Plan

- Metal sheet thickness modification.
- Punch and matrix modification by the user.

Thank you for your attention

Any questions ?