Assembly plant of Airbus A380 Toulouse, France

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1 GENERAL INFORMATION

Client:
EADS - AIRBUS France

Architect:
ADPi and CARDETTE et HUET

Planning of structural framework:
Jaillet-Rouby

Executive company:
URSSA (Spain)
CIMOLAI (Italy)
CASTEL et FROMAGET
JOSEPH PARIS
RICHARD DUCROS
BUICK
GAGNE
RENAUDAT

Fire protection expertise:
CTICM and al.

Processing time:
2000 – 2004

Kind of building:
Plant of aircraft

Main parameters:
Common building span ≥ 100 m
Average building height ≈ 45 m

Ground-plan:
200 000 m²

Figure 1. Assembly plant of Airbus A380 (Photograph E. Grimault)

2 INTRODUCTION

The assembly plant of airbus A380, the future largest passenger aircraft in the world, occupies an area of 300 ha. It is also one of the most important industrail projects currently going on in France. In July 2006, the first aircraft A380 assembled in this plant will be delivered.

3 DESCRIPTION OF THE PLANT AS WELL AS ITS BUILDINGS

The buildings of the plant are arranged along the North-South axis corresponding to the assembly course of an aircraft A380 from the delivery of its sections in the North of the site until its haulage toward the airport zone. Once the sections trasported to the site, they are unloaded in the North part of the site and then prepared in the building called as apse. The aircraft is firstly assembled in the hall S7X and brought to halls S5X for additional equipment assembly (hydaulic and electric), some specific tests and the mounting of motors. Finally, the aircraft will be moved to an external area where it will be subjected to the last tests before its first flight. An independent and specific hall (S34) in order to perform static testing for attestation of A380 is built on the site. The second independant hall which is 40 m away from the

presvious one will be used for realising the weighting and recoating of the aircraft.

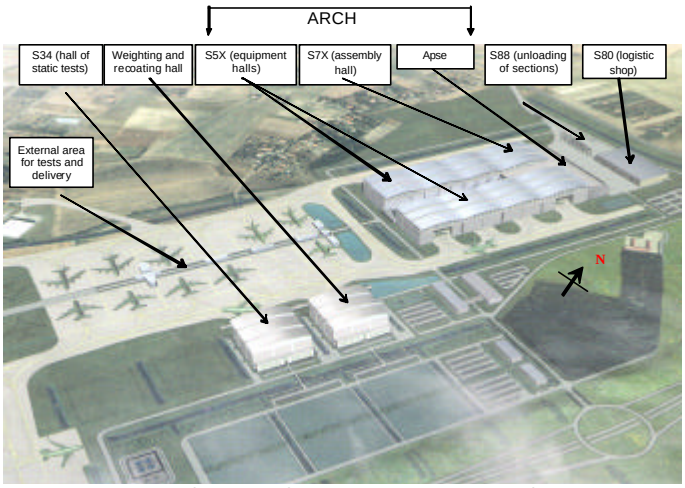

Figure 2. Steel frames of the assembly plant of Airbus A380 (Copyright by EADS Airbus)

The main characteristics of these buildings are:

- S88, building for unloading of sections: ground area – 44 m x 135 m, internal net height – 14 m, maximum outside height – 16 m;
- S80, logistic shop: ground area – 85 m x 70 m, internal net height – 10 m, maximum outside height – 14 m;
- Apse, building for assembly preparation: ground area – 50 m x 250 m, internal net height – 20 m, maximum outside height – 23 m;
- S7X, assembly hall: ground area – 115 m x 250 m, internal net height – 32.3 m, maximum outside height – 46 m;
- S5X,equipment hall: ground area – 6 cells of 95 m x 100 m, internal net height – 32.3 m, maximum outside height – 44 m;
- S34, hall of static testing (weighting and recoating hall): ground area – 100 m x 100 m, internal net height – 32.3 m, maximum outside height – 44 m.

All above buildings are in steel structure. In most cases, the lateral stability of them is provided by bracing system using truss frame.

4 FIRE SAFETY STUDY

The ordinary fire safety requirement is not applicable to such type of work. As a consequence, the experience from similar works is used and the discussion is necessary with fire brigade and insurance company to settle the solution. It has been decided to use a fire partition wall between assembly hall (S7X) and equipment halls (S5X) in order to limit the loss in fire situation. Then question arises about the possible progress collapse of above two buildings due to the failure of one of them in case of fire.

Figure 3. Assembly hall of airbus A380 (S7X) (Copyright by EADS Airbus)

In order to give an answer to above question, a fire safety study has been made by CTICM on the basis of natural fire concept using following three fire scenarios:

- Fire of delivery truck near the column;
- Fire of aircraft without fuel and various working tools;
- Fire of aircraft full of fuel.

The approach of global structural analysis is applied showing that the collapse of columns could create a dynamic impact of steel truss beam on concrete partition wall leading to its damage. As a consequence, the intensity of sprinklers for columns is increased to avoid such failure mode.

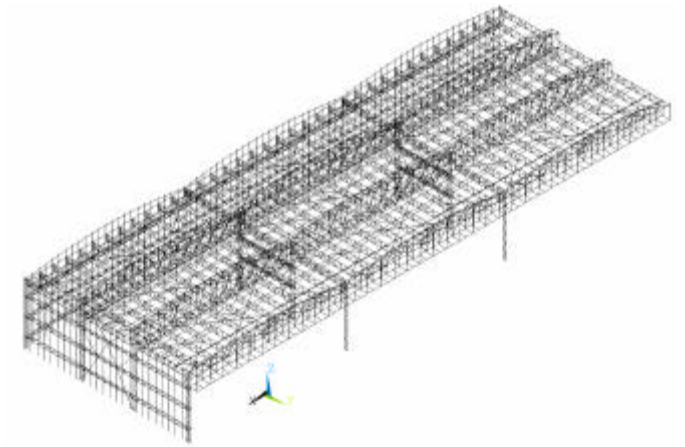

Figure 4. Applied modeling in global structural analysis of fire safety engineering to building S5X

REFERENCE

CTICM Revue Construction Métallique N°1 2004, « Usine d'assemblage de l'Airbus A380 sur le site aéroconstellation à toulouse»