



Thermo-acoustic instabilities in syngas combustors



a Workshop organized in the framework
of the FP7 project LIMOUSINE

6-7 September, 2010 - Zaragoza / Spain

Syngas fuels may become available from a number of sources, including both fossil and renewable solid fuels, and offer very interesting possibilities: valorisation of biomass or residues, CO₂ reduction through H₂ enrichment... The use of these alternative fuels in gas turbines is a challenging objective, due to their peculiar combustion characteristics. The risk of combustion instabilities, still a serious problem with conventional fuels, is one of the most important issues.

The workshop will aim to present current views and experience of the manufacturers and users of gas turbine engines operated on syngas. Further will be discussed the characteristics of syngas flames in combustors with relation to the coupling with acoustics. The effect of a variation of the contents of hydrogen and methane will be explored by means of available knowledge.

Programme

Monday, September 6

13:30 Welcome lunch and registration

15:00 Syngas: Production and properties
J. Ballester, Univ. Zaragoza / LITEC

Fundamental aspects of hydrogen and syngas combustion (1)
A. Sánchez, Univ. Carlos III – Madrid

16:40 Coffee break

17:00 Fundamental aspects of hydrogen and syngas combustion (2)
A. Sánchez, Univ. Carlos III – Madrid

Tuesday, September 7

- 10:00 Characterization of lab-scale syngas flames
J. Ballester, Univ. Zaragoza / LITEC
- 11:00 Coffee break
- 11:30 Syngas combustion in a 300 MWe IGCC power plant: issues and operational experience
F. García Peña - ELCOGAS
- Visit to Univ. Zaragoza/LITEC combustion facilities
- 13:30 Lunch
- 15:00 Operation of industrial gas turbine engines on syngas
Piet Kamminga, Ansaldo Thomassen
- Combustion dynamics in syngas fired gas turbine engines
W. Krebs, SIEMENS
- 17:00 Closure
- 19:30 Guided tour
- 21:00 Workshop / LIMOUSINE meeting dinner (Rest. Club Náutico)

Venue

The Workshop will be held at the Centro Politécnico Superior of the Univ. Zaragoza (Address: María de Luna, 3)

- Lectures: Room 220, Betancourt Bldg., 2nd Floor
- Lunches and coffee breaks: Cafeteria of Betancourt Bldg., 1st Floor
- Workshop dinner on Tuesday will be at Restaurant Club Náutico (located in Paseo Echegaray y Caballero, on the side next to the river behind El Pilar church)

Registration form and other information

Available on the workshop website: www.unizar.es/lci/limousine



Numerical analysis of acoustic phenomena in combustors



a Workshop organized in the framework
of the FP7 project LIMOUSINE

9-10 September, 2010 - Zaragoza / Spain

There is continuing pressure on the manufacturers of land-based gas turbines to reduce NO_x further by operating in fuel lean premixed mode even closer to the lean flammability limit. However, operating in this regime can result in pressure and temperature fluctuations that can reduce the life of engine components. In recent years, this problem has been analysed using transient numerical simulations to predict the fluctuating combusting flow in the combustor and the response of the surrounding casing and components.

In this workshop, the methodology of numerical simulation of acoustic behaviour of combusting flows will be introduced. Students will have the opportunity to run their own simulations using the ANSYS software. There will also be a discussion of possible future developments.

Programme

Thursday, September 9

- 9:15 Welcome coffee and registration
- 9:30 Introduction to ANSYS Workbench
Geometry building and CAD import using DesignModeler
- 11:20 Coffee break
- 11:40 Types of dynamical analysis
Workshop practical example
- 13:30 Lunch
- 15:00 Introduction to fluid flow modelling
Scale resolving turbulence models
Turbulent combustion
- 16:50 Coffee break
- 17:10 Acoustic and vibration analysis of combustors
Workshop practical example
- 19:00 End of sessions
- 21:00 Workshop dinner (Rest. Parrilla Albarracín)

Friday, September 10

- 9:30 Introduction to structural analysis
Thermal and vibration analysis
- 11:20 Coffee break
- 11:40 Types of dynamical analysis
Workshop practical example
- 13:30 Lunch
- 15:00 Fluid structure interaction
1- and 2-way coupling of pressure and temperature
- 16:50 Coffee break
- 17:10 Workshop practical example
- 19:00 Closure

Lecturers

The lectures will be presented by Dr. Phil Stopford and other specialists from ANSYS UK Ltd.

Venue

The Workshop will be held at the Centro Politécnico Superior of the Univ. Zaragoza (Address: María de Luna, 3)

- Lectures: Room 209, Betancourt Bldg., 2nd Floor
- Hands-on practice: Computer Rooms 3-4, Torres Quevedo Bldg., 2nd Floor
- Lunches and coffee breaks: Cafeteria of Betancourt Bldg., 1st Floor
- Workshop dinner on Thursday will be at Restaurant Parrilla Albarracín (located in Plaza de Nuestra Señora del Carmen, 1)

Registration form and other information

Available on the workshop website: www.unizar.es/lci/limousine

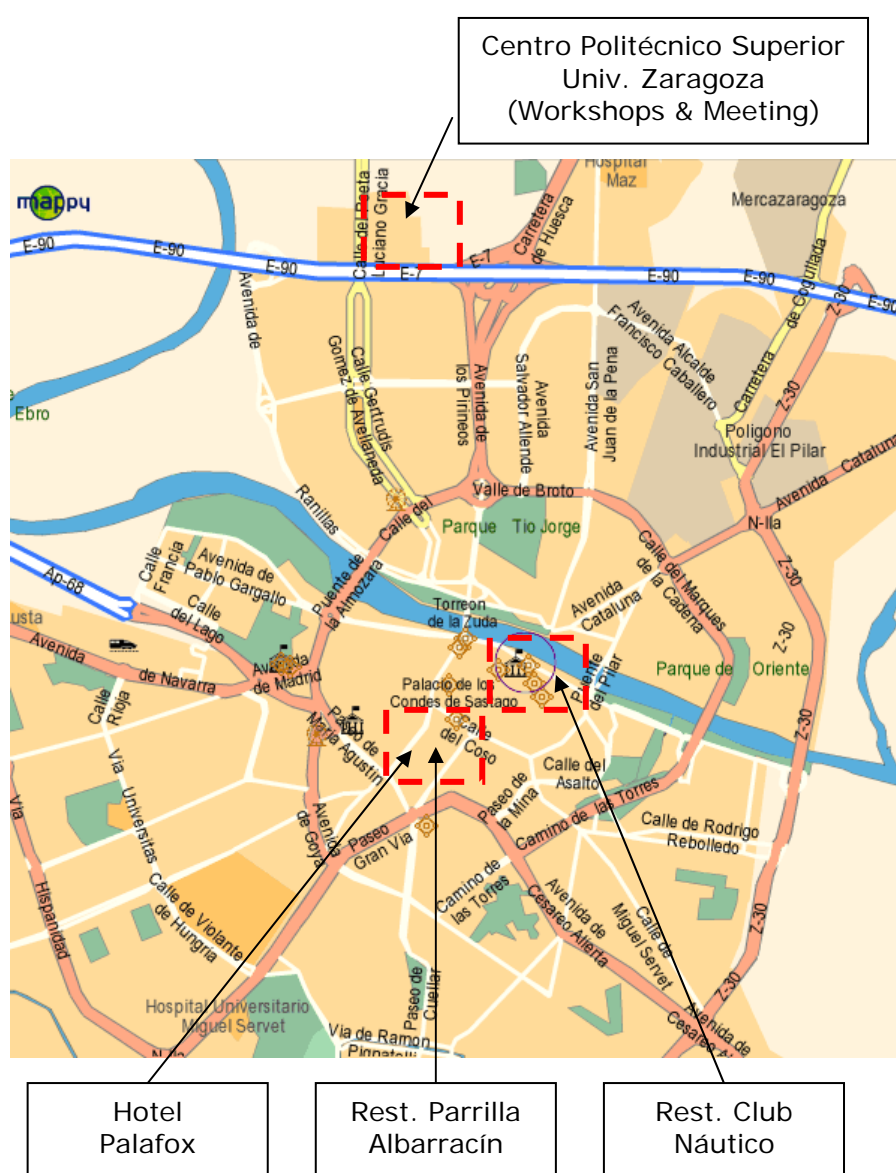
Maps and directions

The following map of Zaragoza shows the locations of the Centro Politécnico Superior (venue for the Workshops and LIMOUSINE meeting), Hotel Palafox and restaurants for the workshop dinners.

Larger views of the squared zones are shown below.

Transport between the hotel and the Centro Politécnico Superior:

- By taxi (approx. 15')
- By Bus Lines 23 or 43 (approx. frequencies: 10' for Bus 23, 30' for Bus 43)



- A – Hotel Palafox
- B – Bus 43, to Centro Politécnico Superior
- C – Bus 23, to Centro Politécnico Superior
- D – Bus 23 and 43, back to Hotel Palafox



- E – Bus stop, Lines 23/43
- F – Torres Quevedo Bldg. – Computer rooms for WS2
- G – Betancourt Bldg. – Rooms for WS1, WS2 and Meeting
- H – LITEC – Visit to combustion facilities



- I – Meeting point for guided tour (Tuesday, 19:30)
- J – Restaurant Club Náutico

