PREFACE

The purpose of the Symposium was to provide an opportunity for engineers and scientists belonging to engineering Companies, research organizations and regulatory bodies to assess the state of the art in models for heat and mass transfer phenomena relevant to accidents and their management in industrial plants. The focus was on physical phenomena of major importance during freseeable accidents, also regarding their possible consequences, i.e. heat propagation in fires, irradiation, convection, clouds formation and mechanism of flashing or explosion, pressure peaks propagation and their effects, toxic substances diffusion, etc. Main thermodynamic and transport phenomena affecting major accidents foreseeable for chemical process plants and chemical substances storage were considered: the physical understanding of these phenomena, as well as experimental data on experienced situations, are necessary for the development of models to be used at the design stage or for the computation of freseeable consequences of given or anticipated accidents. Particular attention was called towards chemical pants, fuel storage, industrial settlements for which high hazard for population may be devised in the case of accidents and which deserve "ad hoc" safety reports. Heat and mass transfer phenomena relevant to accidents prevention were also analysed.

The main topics analyzed were:

Fundamentals
- heat and mass transfer in high-power fires (pool fires, jet fires) and in concentrated and vapour cloud explosions;
- in-vessel and breach-dependent transient thermohydraulics;
- runaway reactions in batch reactors;
- emergency pressure relief from chemical reactor runaway;
- handling of fluid discharge from reactors and storage vessels;
- release, propagation and dispersion of clouds of vapours and toxic gases.

Applications
- criteria for prevention of high power fires; the influence on the design of extinguishing equipment;
- engineered safety features;
- utilisation of passive and inherent safety to limit the hazard and the risk in industrial plants;
- prevention and control of effects from pressure waves due to explosion;
- safe storage and handling of high-hazard toxic materials.

The papers accepted for presentation were 37. They were grouped into five technical sessions, as follows:

Technical session A: Two-phase Flows - Safety and Relief Valves.

Technical session B: Fires and Explosions.

Technical session C: Thermal-Hydraulic Aspects.

Technical session D: Heat and Mass Transfer in Chemical Reactions.

Technical session E: Clouds Dispersion.

Two invited lectures were included in the programme, addressing two particularly relevant issues in the framework of heat and mass transfer in chemical process industry accidents:

- the first one regarded "*Research and Development for Process Safety*" and was presented by Dr A.J.J. Timmermans of the European Process Safety Centre, UK;

- the second one regarded "*Flixborough; Twenty Years Later: The lesson to be Learned*" and was presented by Prof. J.E.S. Venart of the Department of Mechanical Engineering, Fire Science Centre, University of New Brunswick, CANADA.

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Prof. Ing. Antonio Naviglio

Symposium Chairman