

TUFFP Talk

Advisory Board Meeting Scheduled

The next TUFFP Advisory Board meeting will be held May 9-10, 1995, at the Doubletree Hotel at Warren Place in Tulsa, Oklahoma.

A "Request for Information" form is enclosed with this newsletter, together with information on hotel reservations and travel to and from the airport. Persons attending the Advisory Board meeting should complete the form and return it to us as soon as possible.

The Advisory Board meeting will begin at 8:30 a.m. on Wednesday, May 10, and will adjourn at 4:30 p.m. A pre-meeting cocktail party will be held on the 19th floor of the adjacent Two Warren Place Building from 6:00 to 8:00 p.m. on Tuesday May 9. A tour of TUFFP test facilities will be conducted on Tuesday afternoon from 3:00 to 4:30 p.m.

The Advisory Board meeting for the Paraffin Deposition JIP has been scheduled May 8 to accommodate persons attending the Offshore Technology Conference the previous week. Further information is available in another part of this newsletter.

Following is a summary of the dates for May 1995 Advisory Board meetings of other cooperative research programs at The University of Tulsa.

Paraffin Deposition	May 8
TUDRP	May 8-9
TUFFP	May 10
TUALP	May 11
TUPREP	May 11

TUFFP Advisory Board meeting brochures will be mailed to all members prior to the meeting. The brochures will contain sufficient information to help each attendee actively participate in discussions on current and future research projects, financial matters, and operating procedures. Brochures containing slide copy for all presentations will be distributed at the meeting but will not be mailed to members.

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May 1995 Short Course Scheduled

The TUFFP short course "Two-Phase Flow in Pipes" is scheduled to be taught again in Tulsa, Oklahoma, at the Doubletree Hotel at Warren Place May 15-19, 1995. An outline describing the course and an enrollment form is enclosed with this newsletter.

The course will again be taught by Dr. Brill and Dr. Cem Sarica. The purpose of this course is to give participants a well-grounded understanding of the fundamentals of two-phase flow through pipes and restrictions. Completed and current TUFFP research projects permit teaching the latest techniques for designing multiphase flow piping systems for the production and transportation of oil and gas. Upon completion, participants will be able to apply knowledge gained to design fluid flow conduits encountered in petroleum, natural gas, and chemical engineering operations.

The same pricing schedule that was used for the 1994 course will be retained for 1995 and is given below.

TUFFP Member Companies:

Per Person	\$950
Group Discount - Per Person	\$850

Non-Member Companies:

Per Person	\$1,445
Group Discount - Per Person	\$1,195

We urge member companies to enroll engineers as soon as possible to assist us in planning for the course. If an insufficient number of enrollments is received by May 1, 1995, the course will be canceled. Members can enroll by contacting the Continuing Education Department at The University of Tulsa (918) 631-2347, sending a fax to (918) 631-2154, or by sending a telex to 497543.

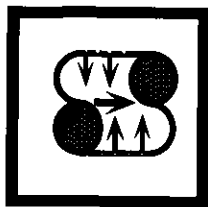
Mark Your Calendars for the BHRG Conference

Members are reminded to try and attend the BHRG seventh biannual multiphase flow conference titled "Multiphase 95 - Where are we on the 'S' curve?" scheduled June 7-9, 1995, in Cannes, France. The final program will include approximately 35 technical papers on a variety of subjects of importance to the production and transportation of oil and gas. Past conferences have brought together approximately 150 of the leading authorities in this area and provided an opportunity for invaluable informal discussions on virtually all ranges of operating problems pertaining to multiphase flow through pipes.

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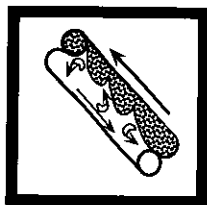
Research Progress R E P O R T S



Flow Behavior in Horizontal Wells

A research report will soon be distributed on the results of a study investigating friction factors for the case of single phase liquid flow from a single perforation into a main flow stream. Analysis of the data obtained permitted developing an improved method for predicting friction factors for this flow situation. The new method was superior to existing published techniques, but also clearly showed the need to extend the study to multiple perforation cases.

The test facility used for the single perforation case has now been modified to permit a constant flux through multiple perforations. Preliminary data acquisition is currently underway and results will be presented at the May Advisory Board meeting.



Non-Emulsified Oil-Water Flow Patterns in Inclined Pipes

Construction is well underway for a new state-of-the art, versatile test facility that will be invaluable for several future TUFFP research projects. This facility will be operational at the May Advisory Board meeting and data acquisition will begin shortly thereafter.

An extensive period of model development for predicting flow pattern transitions for oil-water flow has been underway for several months. Jose Luis Trallero has already developed a superb collection of models based on the two-fluid model and other basic principles including the latest concepts in structural stability. Models that have been developed have then been used to design the experimental program for verification and modification of the models.

This has been one of the most exciting projects undertaken by TUFFP. Application of the preliminary models to essentially all past published data for horizontal flow has been successful in predicting observed flow pattern transitions. Unfortunately, no data exist in the literature for near-horizontal inclination angles.

The next stage of this project will involve predicting flow pattern transitions for oil-water flow in pipes with inclination angles representative of typical wellbores. Following that stage of the study, the effect of a gas phase (three-phase) flow will be investigated.



Downward Two-Phase Flow in Inclined Pipes

Following completion of the initial project on Downward Inclined Slug Flow by Roumazeilles, a decision was made to introduce several modifications to the experimental test facility before continuing the investigation of slug flow. These modifications are currently underway and include the following.

- The boom and test section are being lengthened by about ten feet (sixty pipe diameters) to insure that sufficient entry length exists to have fully developed flow
- The test section instrumentation was revised to yield improved results.
- The separator has been disconnected due to its role in contaminating the kerosene supply and the resulting discoloration of the transparent pipe.
- A completely new supply of kerosene will be ordered for the next phase of the study.
- New Micromotion meters have been added for the gas flow rate measurements.

Other modifications were described in the Winter newsletter.

Most of the above modifications will be completed prior to the May Advisory Board meeting and data acquisition will begin shortly thereafter and continue all summer.

Miguel Paz will join Jiede Yang on this project as a Research Assistant which will permit Miguel to become better qualified to continue the use of the facility on the next project.

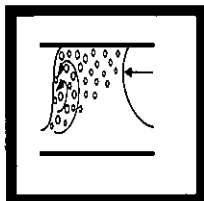
Development of an improved mechanistic model for predicting downward inclined slug flow has concentrated on pressure drop prediction and improved understanding of the slug tail and film region. Further development will require availability of new experimental data.



Transient Two-Phase Flow in Horizontal Pipelines

A report describing experimental data obtained for a variety of two-phase flow transient tests in the 1,400-ft long TUFFP pipeline will be distributed to member companies in March. Some of the details of these tests were described in the Winter newsletter.

A comparison of the transient computer codes OLGA, PLAC, and the TUFFP simplified transient code has been completed. Results from TACITE will become available during the summer months. A second report will then be distributed to member companies that contains a comparison of the experimental data with simulations from these programs.



Slug Flow in Pipelines

A large quantity of excellent quality data have been obtained for steady state slug flow in the TUFFP 1,400-ft. long pipeline. Additional details were included in the Winter newsletter. Processing of the slug flow data is currently underway.

The processed data will then permit analysis of existing statistical slug length and/or frequency distribution correlations and other slug characteristics, including liquid holdup profiles along the slug body, slug translational velocity, pressure drops in the slug body and the liquid film zone, and the total pressure loss in the pipeline during slug flow.

These data were obtained by Dr. Tom Chen. Mr. Robert Marciano participated in the dynamic calibration of capacitance sensors on the flowline. Analysis of the data will represent the Master's degree thesis for Robert Marciano.

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