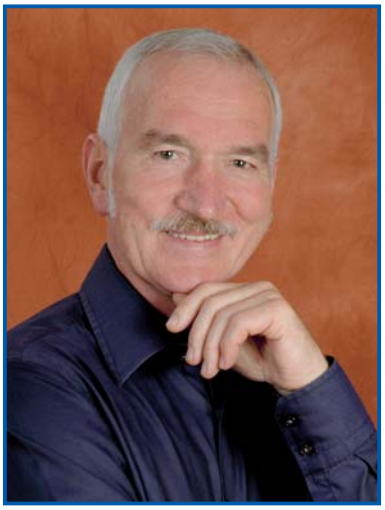
THE PRESS

Consultancy on Hydro-Dyn Press Systems

No. 3/2007

Hello from the Editor



Dr.-Ing. Ulrich Haupt

Dear Hydro-Dyn press user, dear user of Hydro-Dyn press consultancy, dear friend of the Hydro-Dyn press technology,

You are presently holding in your hands the latest issue of **THE PRESS** that carries on the Newsletter editions no. 1 and 2 after a long period of time. The author will again provide information around the Hydro-Dyn press system, such as technical experience gathered, new developments and reports about the work on site.

The author looks back on 7 years of activities as a consultant for Hydro-Dyn presses assisting companies with technical advice. Today, most of the press lines are operated worldwide with high cost-effectiveness.

The work during these years was mainly focussed on the following issues:

- maintaining high press availability;
- prompt assistance by the consultant to minimise machine downtime;
- improving product quality (product edges, non-uniformity in surface gloss);
- modernising technical equipment;
- training of press personnel.

In August 2006, the editor changed the legal form of his consultancy company to a "GmbH", which is the German limited liability company. The name of this new company is **"Dr.-Ing. U. Haupt Engineering GmbH"**.

During the past years, the editor was faced in his work with numerous technical problems and questions that required in most cases an immediate solution due to high costs involved in production line downtimes. The continuous need for technical solutions was generally the motor for press system improvements and for placing high priority on R&D activities in the editor's work. The main focus of the above mentioned R&D activities in the last years – the targets pursued, the results and technical solutions – are described in this Newsletter, inviting the reader to use the new technologies in his machine with a view to improve products and equipment.

What else is found in this Newsletter?
The keynote is a presentation of the company Eucatex in Brazil that uses a Hydro-Dyn press for particle-board production with about 50 % in a direct lamination process. In addition, Trelleborg Rubore AB in Sweden reports about the production of steel-rubber composites used as vibration damping material. Information on an upgrading project for a Hydro-Dyn press installed in 1984 is provided in the article of Flakeboard in Canada. A contribution of Professor Rautenberg deals with the transformation of electric energy to heat in a press system. Spare parts for Hydro-Dyn presses are finally the subject treated in the article of FMH / Springe in Germany – a service provider for press customers. An honouring article dedicated to Klaus Theur, the construction specialist of many Hydro-Dyn presses, completes the latest Newsletter issue.

U. Haupt

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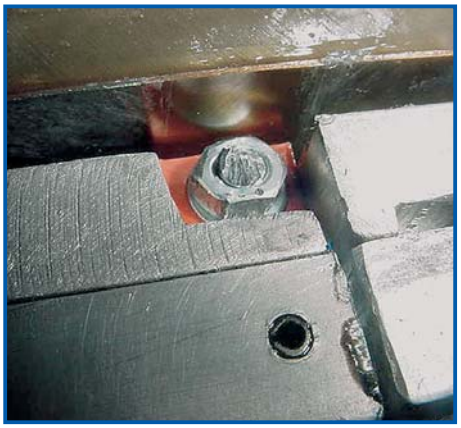
Quite a number of Hydro-Dyn presses are operated at a machine availability of about 98 %. With machines of inferior availability, the consultant's work is consequently not limited to finding a single solution to a current problem, but involves an evaluation of the weakness of the entire system in order to eliminate it in the long run by respective modifications. In addition, the author's R&D activities were focussed on the question of how to improve the product quality. Other important aspects of the work were related to the reduction of the operational costs of a machine. In all of these activities, the dominant point is the attempt to render the flow in the oil film as uniform as possible. The following chapter explains, in which areas advantages could be achieved and provides information as to the respective technical solutions.



View to sealing element installed in a press

Technology for a uniform pressure profile in the press

Perfect product thickness over the entire width is obtained with a uniform oil flow at the press surface. This is sometimes difficult to achieve in the area of the product edges, where the fluid in the oil film is close to atmospheric pressure. Consequently, a small zone of lower pressure on both product edges may occur, which is disadvantageous for certain products. For compressible products, like particle board or fibre board, the lower local pressure induces a local increase in the thickness profile towards the edges.

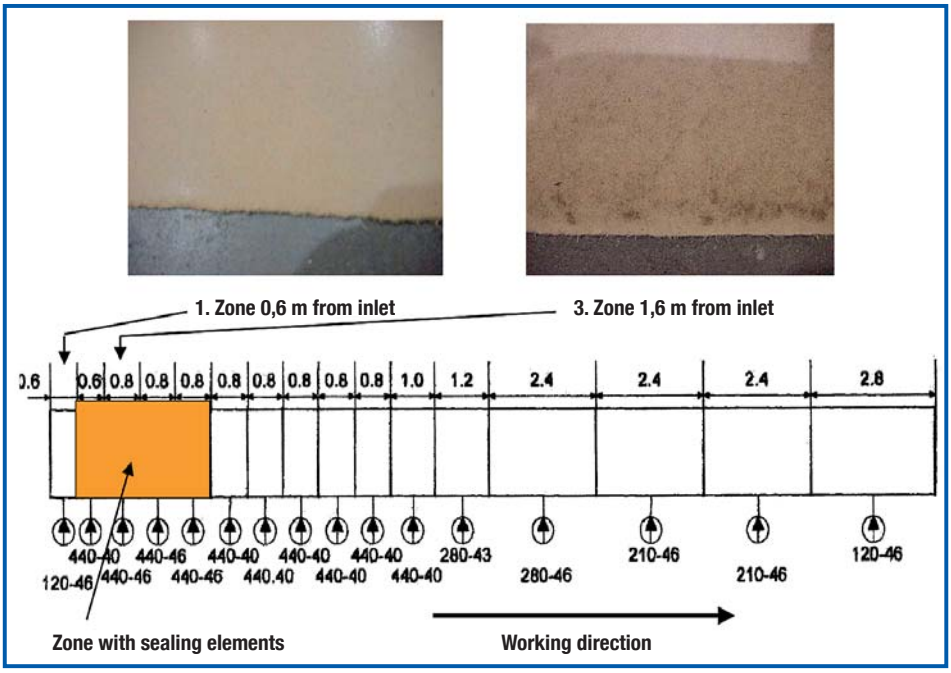
The author discovered that this non-uniformity is due to an oil jet passing between the Al-plates with the Teflon pads. This effect produces a local pressure zone near the edge, which is below atmospheric pressure or corresponds to a kind of vacuum. This phenomenon clearly deviates from the aim to achieve a perfectly uniform pressure profile over the entire product surface – including the edges.

The editor developed a sealing system to avoid this local vacuum, which is currently protected by patent in many countries. It has been tested and is presently used in a considerably high number of presses where it proves its efficiency in practice.

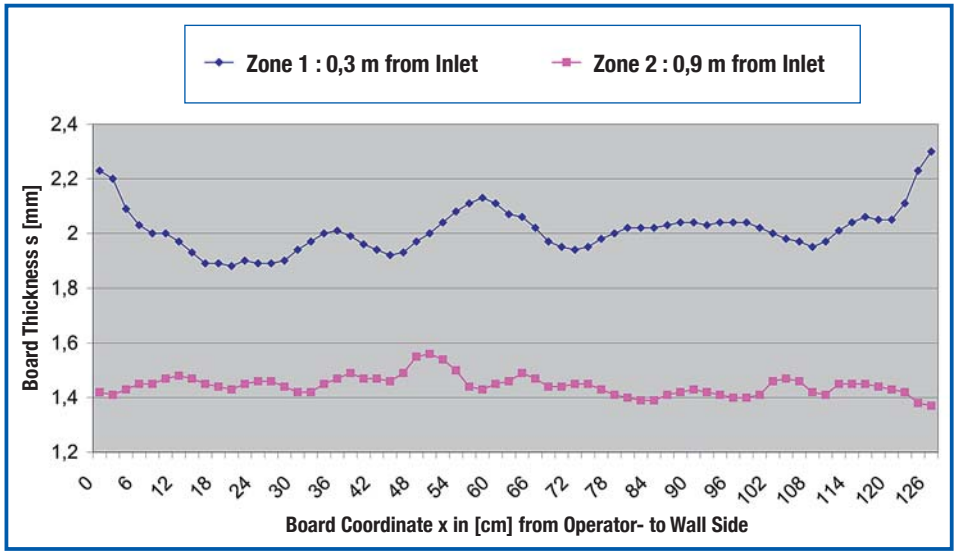
A systematic investigation was carried out on a production press for fibre board to verify the extent of improvement obtained when using sealing elements. This press with a heating platen of a total length of 20 m was equipped with sealing elements in a limited zone of 3.2 m in the high-pressure area, as shown in the sketch below. The remaining area worked in the conventional form without sealing elements.

The press was operated at full production speed and then stopped, while all HP pumps continued to operate, thus curing the board inside the press at rest. After a short time, the press was opened, the board was removed from the machine and the exact curing positions of the board in the press were marked. After this, the board thickness was measured from left to right in more than 20 positions along the board length. Comparisons of the profiles obtained allowed the local pressing conditions to be evaluated in the zones with and without sealing elements.

Board test on a Hydro-Dyn press for thin fibre board at rest. The press is equipped with sealing elements in a 3,2 m long zone in the high pressure area



The diagram below shows board thickness profiles of the product at a position of 0.4 m from the inlet inside the press – where no sealing element is installed. The profile clearly shows a characteristic increase in board thickness towards both edges, which is due to the local vacuum in these areas.



Board thickness profiles of product cured in the press during test at rest located in an area without (blue curve) and with sealing elements (red curve)

Differing from this result, the other thickness curve of board positioned in the zone comprising sealing elements shows board edges of minor thickness complying with the desired quality. The differences in the curves clearly prove the efficiency of the technology applied. While the thickness profiles of board in the press zone equipped with sealing elements all show the same favourable thin edge characteristics, board from zones without sealing elements downstream in the press exhibited more or less thicker edges.

In addition to the diagram, the local brown colour in the photos of the board edge in the measured area indicates cured board or high local press pressure. For the board positioned in the press with the sealing elements, a high compression of the board edge is visible. Today, the sealing element represents a simple and low-cost technical solution that provides significant advantages in terms of product quality. Press users are invited to use this solution with a view to enhancing their product quality.

Technical solution avoiding edge pad wear

Press users generally gathered the experience that Teflon pad wear is more likely to occur on the edge pads than in the centre area. This local pad wear may affect the quality of the product as soon as the wear has reached a certain extent.

The editor has examined the wear process on pads in the press edge area. A technical solution was developed to improve the situation and to increase Teflon pad resistance. In many Hydro-Dyn presses, the product edges are located more inside of the Teflon surface.

Consequently, there are two zones along both edges, where no pressure is acting from the product on the steel belt and on the Teflon surface. The same configuration is obtained, when a press used for different width is pressing a product of small width. In the two resulting edge zones, a fluid pressure is generated below the Teflon part, i.e. between pad and Al-plate. This pressure force pushes the Teflon part against the moving steel belt, inducing friction, heat and local wear.

The technical solution to eliminate this unfavourable effect consists in cutting a groove in the Al-plate connecting the space below the Teflon pad to ambient pressure. Such a groove machined with the appropriate cross-section at a defined position eliminates the unfavourable effect described above, by avoiding the generation force acting from below. This solution is very efficient and substantially extends the lifetime of Teflon edge pads. At the same time, minimum pad wear is indispensable for obtaining high product qualities. Also this technical solution is patented in many countries.

Teflon pad form connection

A leak oil flow in the gaps between the Teflon pads generally affects the desired uniformity of flow, pressure and temperature in the press. For this reason, the editor has worked on this phenomenon for many years with the aim to minimise the leak flow. This idea was also the driver for the development of the sealing elements.

Additional attempts were made to reduce the leak flow in the press surface by developing a kind of seal between two adjacent centre pads. The idea was to abandon the clear rectangular shape of the centre piece edge and to create a form connection between two adjacent parts. This type of pad showed favourable behaviour leading to longer lifetime during a test in a high-pressure zone of a Hydro-Dyn press for fibre board with specific pressures of 50 - 55 bar.

In the meantime, the new pads were further modified and improved to obtain even higher

stability. The author would like to discuss the benefits of this new solution with press users, who are interested in integrating it into their machines.

New oil groove design for Teflon pads

The silicone oil in a Hydro-Dyn press is guided by oil grooves of rectangular cross-section in the Teflon pads. The flow principle leads from an in-feed groove over the surface between the two fluid passages to the adjacent return groove.

In the calibration zone of particle board or fibre board presses, the machine is locally working with a fairly thin oil film. It was found out, that in these areas different flow resistance in the passage between the two oil grooves in the Teflon pad leads to significant deviations in the flow uniformity.

For this reason, the author developed a new Teflon pad with modified oil grooves. The pad of new design was tested in calibration zones of two presses and showed positive results. It is expected for the future, that this type of Teflon pad will also produce favourable effects in high-pressure zones of presses thanks to its property to minimise the leak flow below the pad. Press users are invited to use this new pad design in their machines, in order to make a further step towards higher flow uniformity, which will produce a direct effect on product quality.

Hydro-Dyn press in Operation Eucatex/Botucatu – Brazil

Flavio Maluf,
President of Eucatex/Brazil

The History of Eucatex

Eucatex sprouted from a sawmill called **"Serraria Americana"** established in 1923. The first plant, known today as Fiberboard Unit **(Unidade Madeira)**, started operating in **Salto** with the manufacture of acoustical ceiling tiles and panels for suspend ceiling systems from its insulation boards (softboards) and little later on began producing its high density eucalyptus-based hardboard.

On November 23, 1951, Eucatex was established as one of the pioneering companies in manufactured products. By 1955, Eucatex was consolidating its presence countrywide and began exporting softboards to Argentina and Mexico. Shortly after, it established representative offices in most of the state capitals in **Brazil**, **Argentina** and **Mexico**. It began exporting to Europe in 1965 and to the United States of America in 1970. From the end of 60's to early 80's, Eucatex carried out a great deal of investment, among them, the setting up of **hardboard line II "Linha Dura II"**, the world's largest press – an impressive 8 story high press in the size of 2440 x 6100 mm.

Expansion also took place in the international trade with the opening of representative offices in the United States (New York), The Netherlands (Amsterdam), Hong Kong, Singapore, Riyadh (Saudi Arabia), The United Kingdom (London), which were established aimed at expanding the presence of Eucatex products worldwide. During this period, Eucatex began the production of its own paints (Unit E-21) for internal consumption to coat its acoustical ceiling tiles and panels as well as its wide range of painted/printed hardboards. A lot of investment in the purchase of farms to plant more forests to keep the company self-sufficient in raw materials was made at that time.

By the end of the 80's, Eucatex had four production areas: Forestry, Eucalyptus Wood Based Products Unit, Metal Unit and Mineral-Agricultural Unit. Its products had been exported to over 50 countries during that period of time.

Around mid 90's, Eucatex set up the most modern paint plant in Latin America in Salto, São Paulo state, with its own sophisticated laboratories. The company began producing household water and solvent based paints, varnishes, sealants, printing inks, industrial paints for the furniture in-

Directly laminated particle board from Eucatex's Hydro-Dyn press

Eucalyptus tree plantation near Eucatex's Botucatu plant

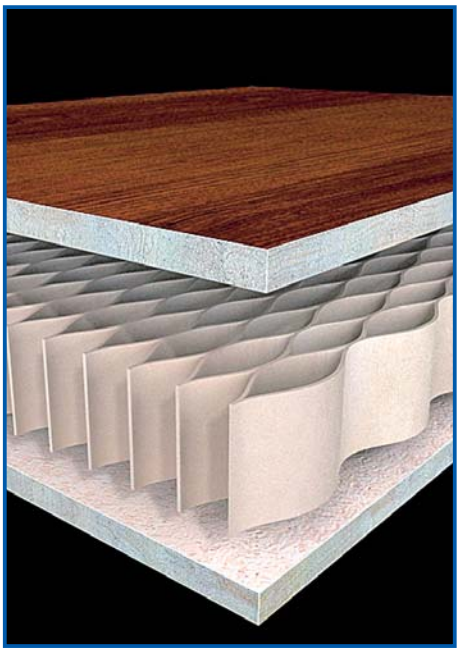
dustry, thus securing a significant presence on the Brazilian market.

At that time, Eucatex also set up a new Particle Board facility in the city of Botucatu, Northwest S. Paulo state, about 350 km from São Paulo City. Later on, the first Laminate Flooring Unit in Brazil was established next to the Particle Board Unit.

By 2001, when Eucatex turned 50 years old, it had several modern industrial facilities, nearly 3000 employees, outputting laminate flooring, flush doors, wall partitions, metal suspension grids, wall partition framework, corrugated steel roofing sheets, hardboard, softboard, ceiling panels, bottling separators, particle boards (chipboard), vermiculite ore, expanded vermiculite ore, agricultural substrata, soil conditioners, paints, varnishes, wood sealants, printing inks, printed decorative papers and so on.

Today, Eucatex is a very strong and respected brand name in Brazil and represented in more than 80 countries in the world.

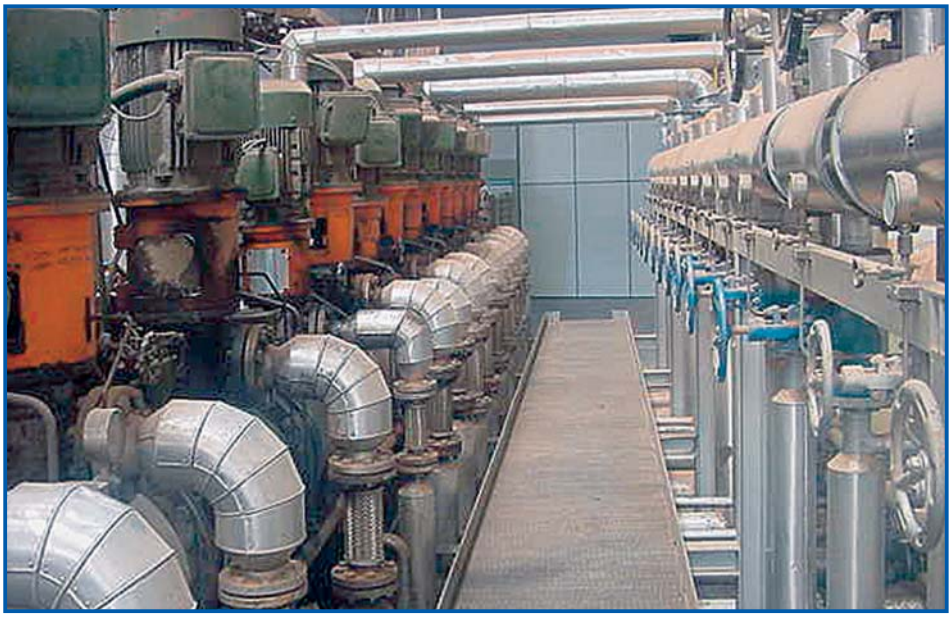
Thin particle board from Eucatex's production



Composition of door skins

The Hydro-Dyn Press of Eucatex in Botucatu

For the particle board production in Botucatu, Eucatex opted for a production line with a capacity of 600 m^3/day comprising a Hydro-Dyn type double belt press. The line consists of 3 BISON forming stations, 2 RF-units followed by a roller-type prepress. After the main press trimming, sanding and cutting is done before the board is conveyed to the cooling device and to the storage.



High pressure pumps of Eucatex's Hydro-Dyn press

The Hydro-Dyn press as the main component of this production line is used to about 50 % each for raw board and for direct laminated board in the press. Appropriate unwinding stations and paper in-feed devices required for the second process are installed in the press in-feed section.

The Hydro-Dyn press has a heating platen length of 26 m and allows board of 1.90 m width to be produced. Main products are 15 mm thick board and flooring material of a thickness of around 8 mm.

The press was originally designed for a daily capacity of 600 m^3 related to 15 mm thick board production. Thanks to Eucatex's continuous improvements and capacity increases, the line currently produces between 1100 - 1200 m^3/day, which is nearly the double of the original design capacity. The contribution of Dr. Haupt helped Eucatex to increase not only the daily production output, but also to keep the board quality stable or even to improve it. This was possible by modifications in the Teflon pad system, the oil nozzle system, the use of sealing elements and a number of measures related to the treatment of the silicone oil in the circuit.

Improvements in the components arranged upstream and downstream of the press additionally contributed to the high capacity and outstanding availability of this production line. Especially the installation of a press control system corresponding to the state-of-the-art allowed the continuous production process on this line to be further stabilised.

Eucatex uses the possibility of cooling under pressure in the last part of the Hydro-Dyn

View to the Hydro-Dyn press in the Botucatu plant of Eucatex

Heating/Cooling tubing section of press oil circulation system

press to reduce the steam pressure inside the product and to achieve increased line speed. The option to vary between four cooling zone lengths additionally ensures an optimisation of the press conditions resulting in favourable product results, both in terms of quantity and quality. This is of particular importance considering the wide variety of Eucatex's products, such as thin and thick raw board or with and without finished foil direct lamination.

In July 2006, a number of important modernisations were carried out on the production line in Botucatu and on the press, in particular. The impeller-type main circulation pump of the hot silicone oil system was replaced by three gear-type pumps, the press drums were corrected and additional valves were installed to allow the operation of the system with an additional cooling zone length configuration. During this maintenance intervention, an additional heat exchanger was integrated into the hot silicone oil circuit and one of the press calibration zones was equipped with Teflon pads of a new advanced design. After this modification, the press is operated at a high level of stability and with additionally improved product quality.

From 2002 on, Eucatex has closely cooperated with Dr. Haupt. Thanks to his input, Eucatex has continuously improved the equipment and the product quality. Ongoing developments are focused on a continuation of this work. Eucatex thanks Dr. Haupt for his valuable technical contribution.

New gear type main circulation pumps of the press oil circulation system

"Refit of Flakeboard's Hydy" Modernisation of an old Hydro-Dyn Press

John Newman
Production Manager for Particleboard / Melamine & Resin at Flakeboard / St. Stephen – Canada

Flakeboard's Hydro-Dyn press for particleboard – called "Hydy" inside the company – is one of the oldest presses of this type. After the installation of the press in 1984, mainly board of 5/8" and 3/4" thickness was continuously produced over the years.

As today's board quality standards have significantly increased, the question of how to improve this production line to achieve more consistent board properties and higher line speed, which means higher production capacity, has been discussed. First of all, a number of improvements in the forming line enabled to provide a more uniform board mat to the main press – an important prerequisite for a higher product quality. In a second step, improvements on the Hydro-Dyn press were discussed with Dr. Haupt and a "Refit project" on the machine was started in January 2006.

Within the frame of these activities, the press top and bottom heating platens were flushed checking the free passage of fluid in the whole system. In addition, the in-feed and return nozzle diameters were modified in compliance with the actual standard on other presses and long-term experience. A number of fine adjustments in this area were done after the start-up of the machine.

Further technical modifications were carried out on the O-ring grooves in the Al-plates, the design of the in-feed pads, the installation of special scraper pads at the press out-feed and the installation of sealing elements in the complete press.

Work on the silicone system was focussed on new installations in the header to guide the flow to the HP-pumps and to transport air-loaded fluid back to the tank.

The restart of the press was accompanied by systematic and repeated board tests after a stop of the machine, curing of the board by the on-going oil circulation and removal of the product. Numerous board thickness profiles measured over the width provided a clear evaluation of the press characteristics in the different zones along the press length. Results of these investigations formed the basis for respective corrections.

Today, the production line is operated at a higher production capacity with more uniform and consistent products being obtained. We would like to thank Dr. Haupt for his contribution to our work and we are proud of the high performance we achieve with our old but modernised machine.

Flakeboard's Hydro-Dyn press for particle board production after the "refit" in January 2006

"Old fashioned – but kept clean and still working properly". High pressure pumps with tubing of Flakeboard's continuous particle board press

Reverse side of press with silicone oil pipes and valves

Correction measures on Trelleborg Rubore's Hydro-Dyn press for vibration damping material

Leif Franzén
Production Manager of Trelleborg Rubore AB in Kalmar/Sweden

Since 2001, Trelleborg Rubore in Kalmar / Sweden has been producing a composite of steel and rubber in a continuous process on its Hydro-Dyn press. The product is mainly used in the automotive industry for noise reduction on brakes and engine housings, as well as for washers and other applications, where vibrations have to be eliminated.

The speed and also the pressure of the press were continuously increased over the past years. Starting with one shift operation, the production line is now nearly fully booked out being operated in 3 shifts and occasionally even over the weekends.

In October 2005, severe tube vibrations occurred during press operation on the piping behind the machine. A reduction of the press pressure and slowing down of the line allowed a satisfactory product to be achieved, but these measures were only successful over a short period of time.

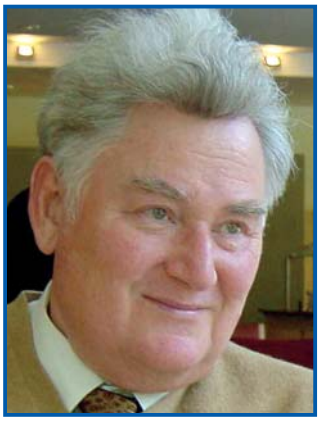
Trelleborg Rubore called the consultant Dr. U. Haupt to solve this problem. He inspected the machine and carried out a number of modification measures mainly on the heating platen nozzle system. The problem is solved since that time and the press can now be operated at a satisfactory performance without vibrations.

Trelleborg Rubore thanks Dr. U. Haupt for his contribution in solving the mentioned technical problem and looks forward to continue the close cooperation with him in order to maintain the high level of availability and performance of the press.

View to Trelleborg Rubore's clean pump room of the Hydro-Dyn press for the production of rubber steel compound material

Lonnie Walker of Panolam Industries/Pioneer Plastics in Morristown/Tennessee USA (right) welcomes Dr. Haupt assisting during a maintenance on his Hydro-Dyn press for the production of decorative laminates

"Waste or use"? About electric energy for Hydro-Dyn presses



Professor Dr.-Ing. Manfred Rautenberg
University of Hannover/Germany

Electric energy accounts, among others, for the most important operating costs during the production on Hydro-Dyn presses. Competitors tend to draw the attention to this subject as an argument speaking against the system.

Electric energy is required for the motors of the numerous HP pumps, the main circulation pumps and the press drives. The question arises, where the considerable amount of energy fed into the system – especially into the motors of the various pumps – finally ends up.

Together with Manfred Rautenberg, Professor at the Institute of Turbomachinery of the University of Hannover, this subject was examined by thoroughly studying the energy equations of a fluid pump. The performance N_P of a pump corresponding to the energy input A per time period is

$$N_P = \frac{A}{\Delta t} = \frac{\Delta p}{\rho \cdot \eta_P} \cdot \dot{m}_P \qquad \textbf{(1)}$$

N_P = Pump performance
A = Pump energy
Δt = Time period
Δp = Static pressure rise $p_{outlet} - p_{inlet}$ of pump
$\dot{m}_P$ = Oil mass flow of pump circuit
ρ = Fluid density
η_P = Pump efficiency

This energy per time is fed into the fluid by increasing the pressure level. Expanding back to the basic pressure level transforms this energy into heat – increasing the fluid temperature level. A certain amount of this heat ($Q_{amb.}$) is transmitted to the ambiance on its passage downstream the pump and returning back to it. This heat transmission can be heat convection, heat radiation or heat conduction.

$$A = m_{oil} \cdot cp_{oil} \cdot \Delta t + Q_{amb.} \qquad \textbf{(2)}$$

m_{oil} = Total mass of oil in the fluid circuit
cp_{oil} = Specific heat of the circulating fluid
Δt = Temperature difference $T_1 - T_2$, with T_1 = pump inlet; T_2 = pump outlet
$Q_{amb.}$ = Amount of heat dissipated in the ambiance by heat radiation, heat convection and heat conduction

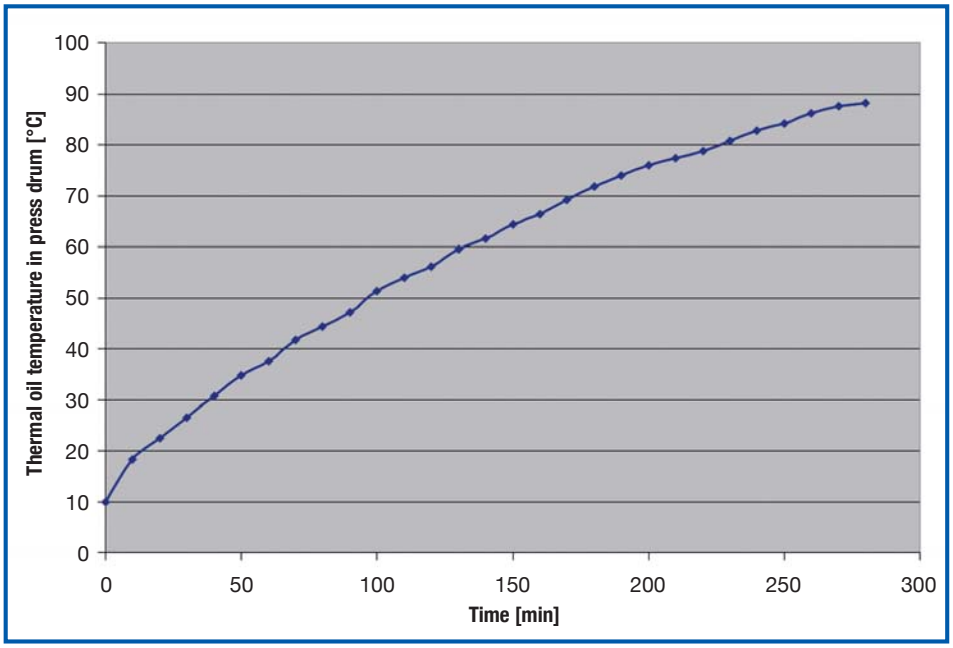
A combination of the equations **(1)** and **(2)** leads to the temperature difference of the fluid with the pump energy being completely dissipated in the fluid:

$$\Delta t = T_2 - T_1 = \frac{A - Q_{amb.}}{m_{oil} \cdot cp_{oil}} = \left(\frac{\dot{m}_P}{m_{oil}}\right) \cdot \frac{1}{cp_{oil}} \left(\frac{\Delta p}{\rho \cdot \eta_\rho} \cdot \Delta t - Q_{amb.} \cdot m_{oil} \cdot cp_{oil}\right)$$

This equation shows, that the pump energy is not lost but converted into heat – increasing the temperature level of the fluid passing the pump. A higher loss of heat to the ambiance reduces the temperature increase Δt.

This fact could be practically demonstrated on a Hydro-Dyn press, where the heating circuit of one in-feed drum was started – without opening the valve to the heating source. Consequently, the impeller pump just circulated the oil through the bores in the drum cylinder, the piping and back in a closed cycle.

The temperature in the fluid was measured and showed the following characteristic:



After about 4.5 hours, the drum was heated to an oil temperature level of about 100 °C – without an external heat source.

At the beginning of the heating up process, the temperature difference between the drum and the ambiance is high. Consequently, the heat transfer to the ambiance by heat radiation, heat convection and heat conduction is low and the temperature increase of the drum is low.

Later on, at higher drum temperature, the heat exchange with the ambiance is high and consequently the drum temperature increase gets weak. This explains the characteristic of the above given curve. The heat energy transferred by the thermal oil impeller pump to the drum during the heating-up process was calculated as a rough estimate, by neglecting the heat transferred to the ambiance and by assuming a linear characteristic of the heating process.

$$\Delta Q = m_{drum} \cdot cp_{drum} \cdot \Delta t \qquad \textbf{(3)}$$

ΔQ = Heat energy
m_{drum} = Mass of drum
~ 13 000 kg
cp_{drum} = Specific heat of drum material
~ 0.111 cal/degree x g
Δt = Temperature difference
88.3°C – 10°C = 78.3°C

ΔQ = 112 987 kcal

Heat energy per time

P = 28.14 kW

This capacity was transferred in 4.67 hours (280 min) time from the impeller pump to the fluid and from there to the press drum. The value is lower than the performance of the pump at the respective operating point – given by the pump characteristic of

P = 35.74 kW

The difference is explained by the heat that is transmitted by the surface of the press drum to the ambiance and to the steel construction, holding the drum.

The heating-up process of the press drum without an external heat source demonstrates, that the electric energy for the pump is converted into heat in the fluid.

Considering the high pressure pumps of the Hydro-Dyn press system, a lower amount of heat has to be added to the fluid in the heat exchanger saving respective costs for heating at this point. The only disadvantage lies in the fact that electricity is an expensive form of energy as compared, for example, to heat produced by an oil burner.

How to benefit from the consultant's technical experience

During the seven years of the consultant's professional activities, the demands of the customers were very different. Some companies were faced with problems related to product quality often caused by increasing standards or – for example – by the demand for a still higher level of surface quality. Other companies changed their technological product formulation and were looking for suitable press operating parameters. Still other customers experienced local wear in the machine, where the mechanism of the process had to be analysed and the problem to be eliminated. In addition, the work of the consultant was focused on increases in the press efficiency by achieving higher production speed, the organisation of a suitable spare-part stock or the training of the operating staff by providing information on the oil flow mechanism within the machine. The work on these various questions on a multitude of presses enabled the consultant to gather a wide technical experience around the Hydro-Dyn press, which provides a useful tool and a helpful background when solving technical press problems.

Different forms of business relations have been developed between the customers and the consultant – depending on the specific requirements and on whether a customer appreciates continuous competent technical assistance.

Some companies cooperate with the consultant on the basis of a contractual agreement, which defines a close cooperation and implies that first priority is given to this company whenever support is needed. Other forms of cooperation are based on agreements between the partners organising the consultant's presence during – for example – the press maintenance period in summer and after Christmas. In this case, the press is inspected on a regular basis and all deviations can be eliminated in time, before losses

in product quality or wear problems lead to expensive production interruptions. Working within the frame of the mentioned two forms of cooperation ensures that the consultant is well informed about the technical standard of the respective press, the weak points of the machine and the specific operating conditions. This enables him to provide an utmost efficient assistance.

Still other companies just need the consultant's support when technical problems arise on the machine or – for example – when a decrease in product quality requires an evaluation of the system and possible corrections.

The consultant invites press-operating companies to benefit from his wide technical experience – with the form of cooperation being adapted to the customer's individual preferences.

The editor's way to Hydro-Dyn press consultancy

During his work, customers often ask the editor of this Newsletter and consultant about how he became a specialist in this field and his previous professional activities. Here are the details:

Born in 1944, the editor got his school education at a German Gymnasium and took the school leaving examinations in 1964. After this, he had to do his military service and left after 2 years with the military rank of a lieutenant. He then continued with a 6-month traineeship in mechanical engineering at a German machine company. In 1966, he started his studies in mechanical engineering at the University of Hannover and graduated in 1973. During this time, he completed his theoretical professional education by traineeships in England (3 months), France (4 months) and South Africa (3 months) taking his final examinations in foreign languages at the same time. This enabled him later to teach French over 8 years beside his job.

After this professional training, Dr. Haupt continued to do research at the University of Hannover/Germany where he was employed at the Institute for Turbomachinery. Here, he was involved in theoretical research and practical investigations on blade vibration phenomena on centrifugal compressors. He wrote his doctoral thesis about this subject and received his doctor's degree with distinction in 1984.

The research work he carried out involved at first the development of an 8-channel telemetry data transmission system, sending data from semi-conductor strain gages fixed on the fast rotating impeller blades of the compressor by radio transmission to a receiver located outside. On the basis of this technology, the blade vibration frequency and intensity in various operating conditions defined in the compressor diagram could be investigated. The experiments were carried out on a 1350 kW driven centrifugal compressor.

The work was focused on the evaluation of the danger the different excitation caused to the blades. The investigation was carried out in close cooperation with leading German and Swiss industrial companies working in this field. An outstanding success was obtained by the experimental proof of a complete reverse flow in an impeller of a centrifugal compressor exciting the blades. This was the basis for a new explanation of the "rotating stall" phenomenon in compressors, now explaining it as a vortex and no longer as a simple flow separation effect. The editor continuously presented results of his work on national and international congresses and in journals. At the end of his professional career at the University in 1989, he looked back on 83 publications in his field.

Beside these research activities, the editor gave lectures in "Turbomachinery" at the Fachhochschule Lippe from 1985 - 1988. After he had abandoned his position at the University, he continued to give lectures in "Unsteady Flow Phenomena" from 1992 - 1998 at the University of Hannover .

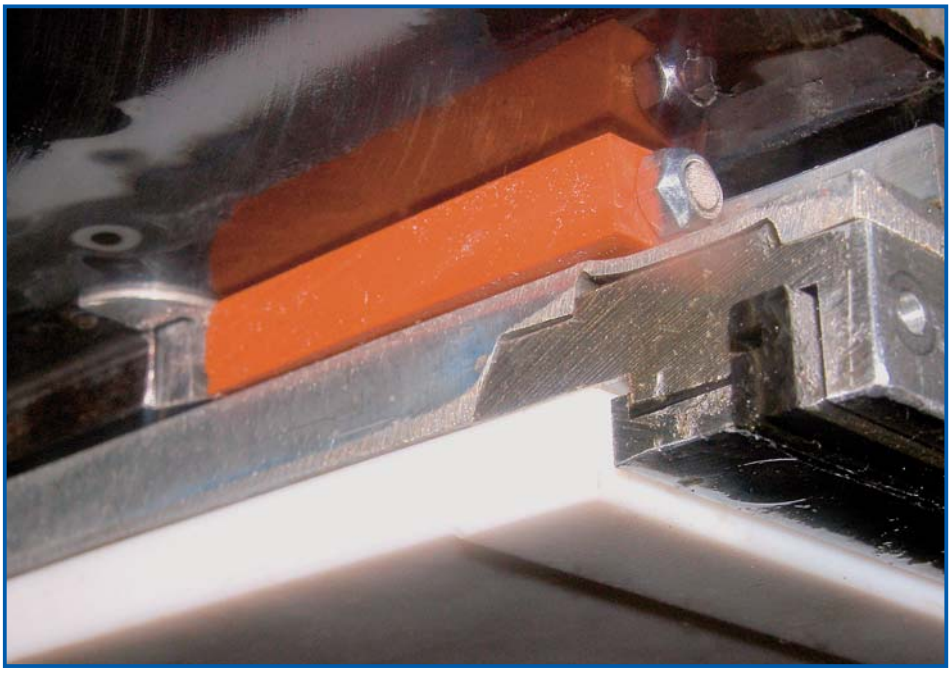
In 1990, Dr. Haupt joined the company BISON-Werke as the head of the Hydro-Dyn press department, responsible for the development of the system. Over 10 years, he improved the system to advanced performance and served press customers to achieve more satisfactory press operating conditions. His knowledge in fluid flow, turbomachinery and vibration phenomena formed the basis for this work.

In 2000, the successor of BISON stopped the business activities in Hydro-Dyn presses. At this time, Dr. Haupt started his own business as a consultant in this field, where he was active the years before. This enabled him to focus his work completely on the wishes of his customers and to do fundamental work in further developing the system. In the meantime, a number of his findings and technical solutions on the press mainly aimed at product improvement have been patented.

Dr. Haupt is supported in his daily business activities by his wife Ursula. The eldest son, Matthias, has just completed his high school education in economics. The second son, Ingo, is actually doing a professional training in mechanics directed towards studies in engineering. The third 18-year-old son Simon is still at school and will surely end up in future professional activities in physics and chemistry.

Travelling around the world as a consultant requires physical strength for the job. Thanks to continuous sport activities, such as handball, football, jogging, as well as gardening and sauna, Dr. Haupt is in a position to meet this challenge. Every year, one week is regularly reserved for a walking tour through the Alps and for a boat tour, both being carried out with friends.

View into an open press to a sealing element causing uniform product edge thickness



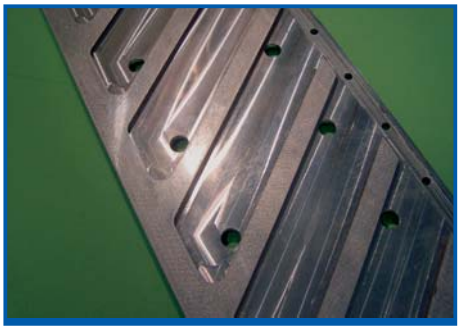
FMH – The spare parts source for Hydro-Dyn presses

Guido Metzig
Owner and head of FMH Produktions GmbH, Springe/Germany

Spare parts availability plays a key role for companies operating a continuous double belt press due to the high costs for machine stops and the risk of waiting for the supply of spare parts. For Hydro-Dyn presses, FMH Produktions GmbH in Springe near Hannover/Germany, is the number-one supplier of the complete range of original spare parts for this machine to customers worldwide, e.g.

- Teflon pads in virgin and Carbo-Teflon
- Al-plates
- Edge bars
- PEEK – ledges
- Al-nozzles
- O-rings
- Silicone rubber seals and scrapers
- Drum scrapers
- Heating platen nozzles
- Sealing elements
- Lip seal holders
- Scraper pads
- HP-pumps
- Main circulation pumps
- Pump spare parts
- Pipe seals
- Valves

  and many other press items



FMH – Spare-parts for Hydro-Dyn presses

Being a small company specialised in these products, FMH provides the advantage of fast production and rapid reaction with night-shifts or by additional personnel, if parts are urgently required. Corresponding proof has been given to Hydro-Dyn press users many times during the past years.

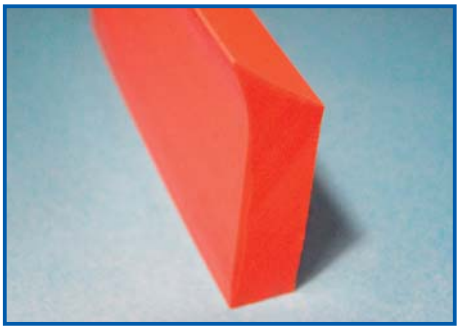
In addition, press spare parts require a high level of manufacturing accuracy due to the differences in heat expansion factors of the different materials when exposed to high temperature. On the basis of over 20 years of experience in the manufacturing of these parts, FMH has acquired in-depth competence to serve its customers with high value products.

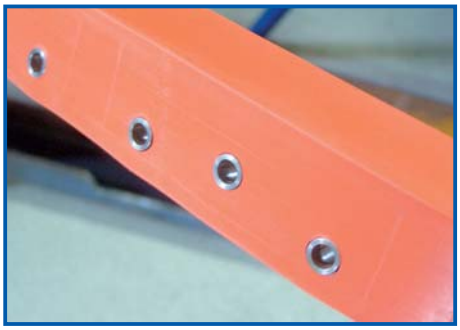
Furthermore, the direct business contact between supplier and user ensures the lowest possible price level for the spare parts. A further cost reduction was obtained when FMH purchased a new milling machine designed for the manufacture of multiple Teflon parts in a single operation. This advantage was passed on to the customers last year by reducing the costs for products manufactured on this new machine by 8 %.

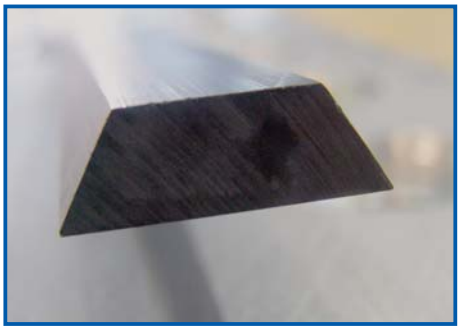
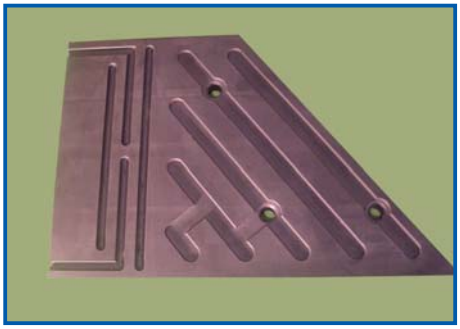
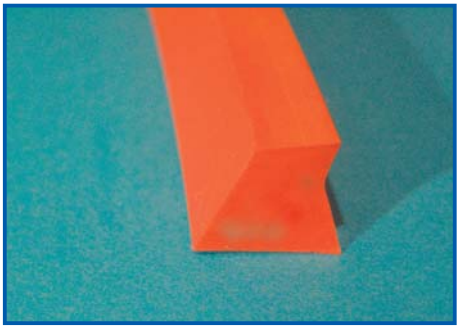
In addition to the production of spare parts for Hydro-Dyn presses, FMH is cooperating with Dr. Haupt in the development of new Teflon pads and press parts. In the past, prototype pieces were manufactured and tested in machines of press users, resulting in a number of valuable improvements. This work is focused on further increasing the pressure uniformity in the press area and on reducing the wear of the parts, in order to cut the press operating costs by an extended lifetime of the press components.

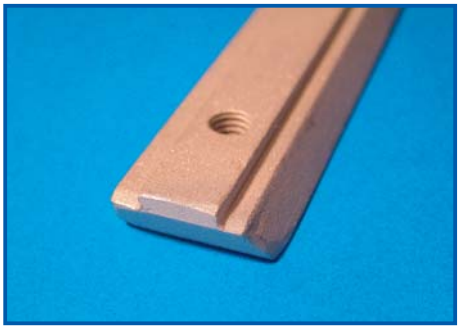
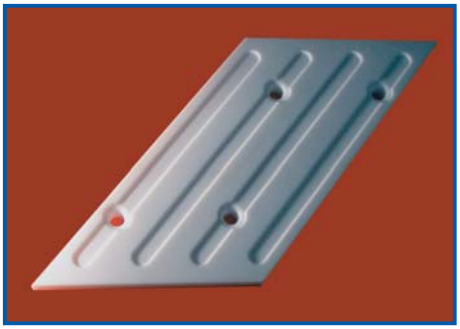
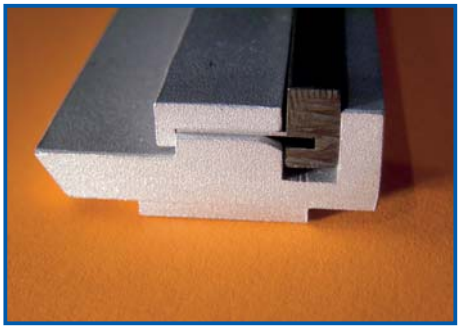
In June 2004, the company FMH underwent a change in ownership. Guido Metzig took over the business as the new head of the company and an additional specialised employee joined his team.

FMH continues to offer original spare parts to Hydro-Dyn press users on the basis of its in-depth competence. Guido Metzig and his team are willing to work hard to perfectly meet their customers' requirements in terms of product quality, production time and costs.

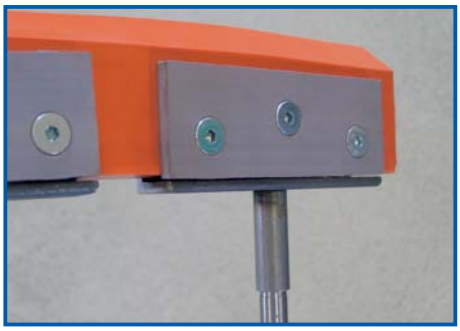





FMH – Spare-parts for Hydro-Dyn presses

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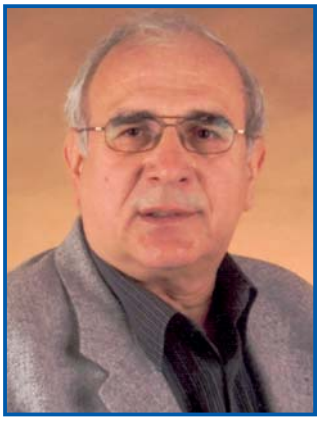
Klaus-Dieter Theur – Pioneer of Hydro-Dyn



Klaus-Dieter Theur

There is hardly any company operating a Hydro-Dyn press to which the name of Klaus-Dieter Theur is unknown. During the installation of the presses, he was the technical person supporting the people, who actually mounted the equipment on site. He provided technical advice and was the first address for claims and critics, when parts did not fit together and when design corrections were necessary.

Klaus-Dieter retired in 2004, when Metso, the successor of the Hydro-Dyn press manufacturer BISON, left the press business. Until his retirement, he was over many years the construction specialist of the Hydro-Dyn press department at BISON (later Kvaerner and Metso), and responsible for the design of the tubing around the steel framework of the press and in the pump room. He was involved in the design of nearly all presses and his responsibility ranged from the first line on the drawing board up to the start-up of the machine. Klaus-Dieter, always open to modifications, changes and improvements in press design, is extremely committed to his work and even worked at night, when urgent phone calls came in from the plant site.

Klaus-Dieter started his professional career with an apprenticeship as a mechanic at Volkswagen Hannover. He continued his professional education with studies in mechanical engineering in Hannover and joined BISON in 1974. In this company, he found his favourite working domain in 1985 in the Hydro-Dyn press department. Working in this area did not only involve the presence in front of the drawing board, but was characterised by contacts to colleagues and customers world-wide.

For Klaus-Dieter these friendships – many of them still ongoing after the retirement – form a valuable part of his life. He looks back on the interesting time of his professional life and is proud of having contributed to the development of the Hydro-Dyn press system. Besides the professional activities, he played soccer and acted as a soccer referee later on. After this, sailing his boat – sometimes even in longer sailing tours – became his favourite passion.

The editor is still in close contact with Klaus-Dieter and benefits from his profound knowledge in press tubing design and his wide experience. Klaus-Dieter is the person who works out the drawings today, for example, when an impeller type main circulation pump has to be changed to several gear pumps and when the tubing in this area has to be completely modified.

The editor is sending a hello to Klaus-Dieter and expresses his gratitude for the close and friendly cooperation in the past. Klaus-Dieter is invited to keep the important position inside the team committed to Hydro-Dyn press technology.

Acknowledgements

The editor would like to express his thanks to all authors of articles in this issue of **THE PRESS** for their contribution. Thanks are also due to those companies that have co-operated with the editor in turning ideas for improvement of the press system into reality. In addition, the editor is grateful to Mr. K. Bari, for his valuable contribution to the Eucatex article.

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