Technical Visit to Alfa Laval Sdn Bhd

AGRICULTURAL AND FOOD ENGINEERING TECHNICAL DIVISION

by Ir. Assoc. Prof. Dr Law Chung Lim

ON 19 November 2011, the Agricultural and Food Engineering Technical Division led a 17-member team from The Institution of Engineers, Malaysia, on a technical visit to Alfa Laval Sdn Bhd located in Shah Alam.

Headquartered in Sweden and with operations in more than 100 countries worldwide, Alfa Laval is one of the global suppliers of specialised components such as heat exchangers, coolers, separators, pumps and valves. It is also a provider of engineering solutions to various industries such as oil, water, chemicals, beverages, foodstuffs and pharmaceuticals.

The visit started with a presentation by Alfa Laval engineers Mr. Yong Yi King, who gave an overview of the company and its Malaysian operations, and Mr. Manmohan Singh, who gave a presentation of one of the company's core businesses, namely, the heat exchanger. Mr. Manmohan started his presentation with the fundamentals of heat transfer and commented that compact heat exchangers offer several advantages over the conventional heat exchangers.

The advantages include high heat recovery, use of less construction material, potential of revamping and recyclability. Its higher energy efficiency also leads to lower fuel consumption, thus contributing to the reduction of green house gas emissions. One of the unique features of the compact heat exchanger is that it does not need or has less gaskets. This feature triggered the members' interest, leading to an interactive and informative discussion.

Mr. Manmohan then moved on to explain the design of the heat transfer surface. It is made of corrugated plate, thus promoting the turbulence of fluid flow, which in turn improves the heat transfer efficiency. In addition, the turbulence also minimises surface fouling as it creates a wall shear stress that is 5 to 10 times higher depending on the fluid velocity. Compact heat

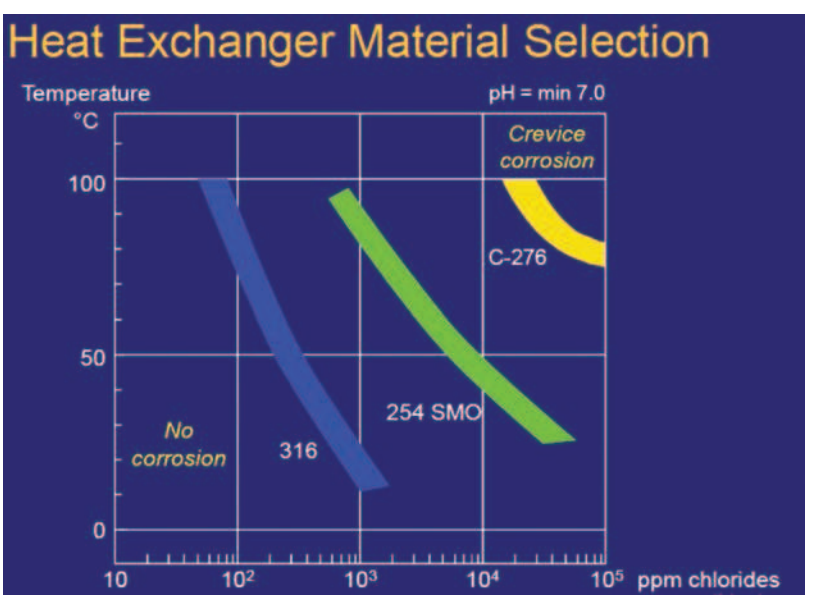

Figure 1: Heat exchanger material selection chart

exchangers also require less space for installation compared to conventional heat exchangers. Furthermore, the weight of the former is less.

Mr. Manmohan also explained the material selection process of the three materials, namely, 316, 254 SMO and C-276. Figure 1 shows the material selection chart with reference to the concentration of chloride ions (ppm). Although a lower grade material may be used, it will result in higher maintenance and a higher rate of wear and tear.

Mr. Manmohan then described the heat exchanger product range supplied by Alfa Laval and showed videos on how the different types of heat exchangers work. These include the plate HE, gasketed HE, semi wielded plate HE, AlfaVap plate evaporator, AlfaCond, Compabloc and spiral HE.

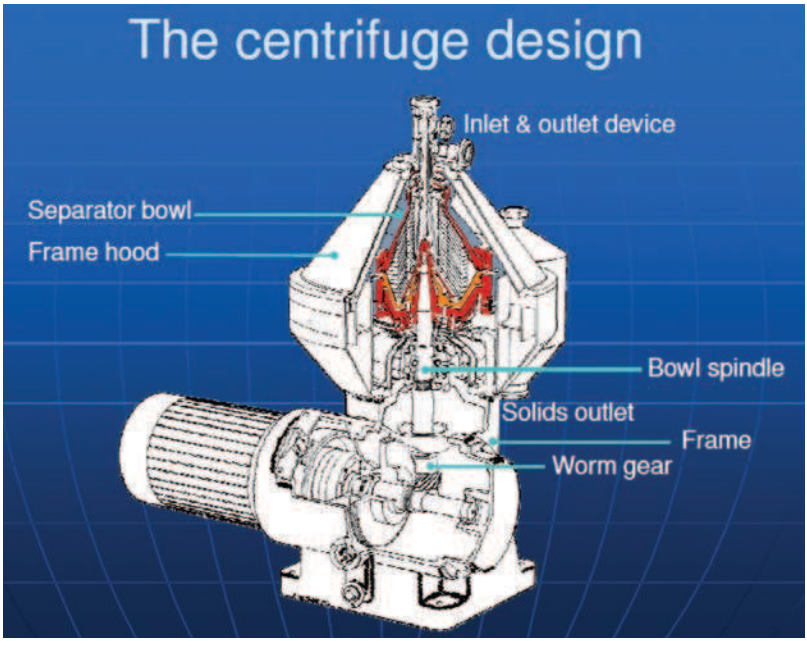

Figure 2: Schematic diagram of a centrifugal separator

Mr. Manmohan elaborated on the working principles of these units and explained the heat transfer taking place in the units. He wrapped up the presentation on heat exchangers by revisiting the differences between Alfa Laval heat exchangers and conventional heat exchangers.

Mr. Yong then took over from Mr. Manmohan and presented another core business of Alfa Laval, which is the separator. He started with the basic principle of centrifugal separation and compared it with Stoke's Law. He then elaborated on the design of a centrifugal separator. Figure 2 shows the image of a centrifugal separator.

Separators can be classified into three categories depending on the concentration of solids in the mixture. The three categories are clarifier, purifier and concentrator. Mr. Yong then explained the three types of solid discharge, which is dependent on the concentration of the solid feed. He concluded by presenting the range of separators available.

Mr. Edmund Yoong then took over and continued the presentation on Alfa Laval's fluid handling equipment which includes pumps, valves, fluid passages and tanks. He then explained Alfa Laval's engineering solutions for various industries, and also explained how HVAC could be applied in the food industry.

Mr. Edmund Yoong shared examples of heating and cooling systems in mega projects such as the Shanghai World Financial Centre, Burj Khalifa, United Arab Emirates, Rosneft Refinery, Siberia, and municipal houses in

Hjo, Sweden. He shared with the members on how district cooling could be applied in high-rise buildings. Figure 3 shows the schematic diagram of district cooling. He gave two famous examples of projects that applied this concept, namely, the Burj Al Arab in Dubai and the Petronas Twin Towers.

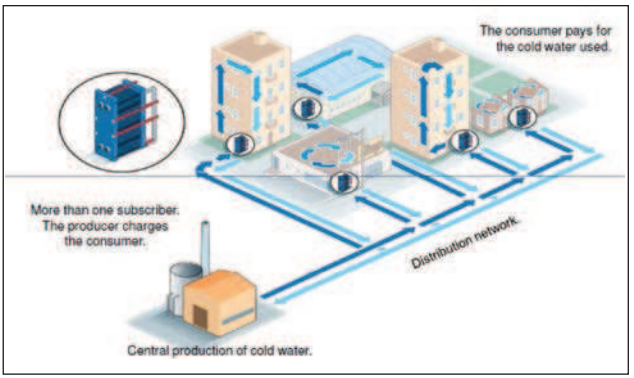

Figure 3: Schematic diagram of district cooling

A group photo taken at the end of the visit

On completion of the presentations, the members were led by Alfa Laval employees on a tour of the workshop facility. The members had the opportunity to view some of the industrial components presented earlier. The visit ended at 1.00p.m. ■