

ENR news



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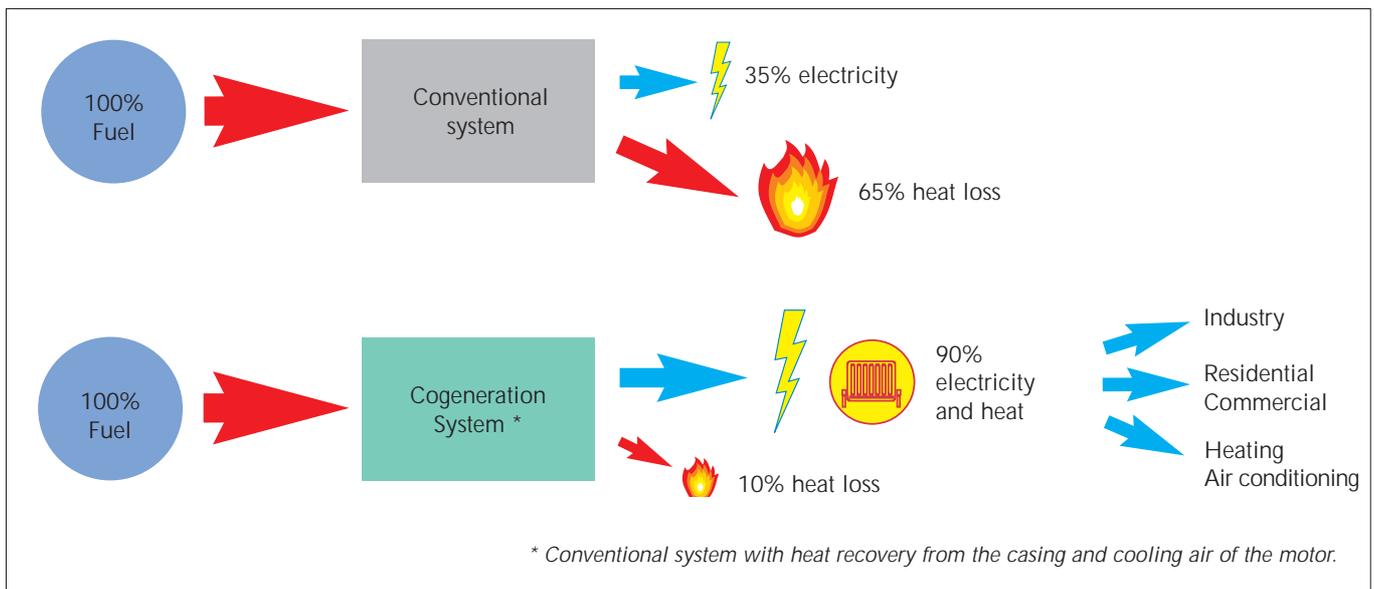
The Charles Quint tapestries
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SPECIAL FILE

The Mansle factory
"Formula 1" in the heart
of the factory

Future of the co-generation

With a rate of efficiency from 85 to 90%, co-generation represents a true success card for the future of European energy. This alternative technology, representing a number of assets, has met with varying success from country to country! At the European Union level, the objective is to double electricity produced in co-generation by the year 2010, therefore increasing the 9% indexed in 1997 to 18%.



What is co-generation?

The co-generation (Combined Heat and Power or CHP) makes it possible to simultaneously produce thermal and electrical energy from a single fuel source, such as gas for example. This technology takes advantage of recovery and recycling heat lost in the conventional process of producing electricity.

A market under development

One generally distinguishes three major fields of applications: the industrial sector (chemistry, paper, agro-food, textile...), the air-conditioning or urban heating sector, and the residential or commercial sector (multi-residential dwellings, hotels, sports and leisure centres, hospital...) where we speak more about "mini" or "micro" co-generation.

Indeed, we see an appearance on the market of



new generations of small systems producing electricity close to the end-user or even by the consumer. The term "mini" co-generation is generally applied to systems below 500 kW, for example to heat a public swimming pool. The term "micro" co-generation is applied to systems below 20 kW an example of which might be a small hotel. The final development could be the marketing new apparatus, in the case of electric household appliances: a boiler, producing heat in addition to electricity.

An alternative high efficiency technology

The fundamental principle of co-generation relies above all, on a perfect feedback between the system and the request for heat from the application. In conventional power generation systems, the energy production is typically only 30 to 40% efficient. More recently, the generation with combined cycles has reached 55%, not including losses in the transmission and the distribution. In the case of co-generation, it is possible to reach a total efficiency of about 90%.

Consequently, it has a real environmental benefit (less CO₂ emissions) and allows a decentralisation of electricity production, nearer to the point

of use, resulting in reduced transmission losses and improved energy efficiency.

Monopolies...

Why isn't there more enthusiasm and commitment on behalf of industrialists and local authorities to adopt this technology more quickly?

The principal long-term obstacle is synonymous with powerful monopolies afraid of the competition from alternative systems. Electricity distributors are not enthusiastic about the idea of industrial customers choosing co-generation rather than to buy their electricity from the public electrical supply network.

Currently, the development of co-generation is variable from country to country. In Denmark, Finland and the Netherlands, production of electricity by co-generation has reached more than 30%. In other countries, like France or Ireland, it is below 3%.

Acceptance and adoption of co-generation depends primarily on political attitude to economic development and the importance attributed to public opinion regarding the

environment Denmark is a true leader in this area. The British government has recently announced a true policy for the use of co-generation and in Finland, the liberalised electricity sector, favours new sources of electricity production such as co-generation.

The opening of the markets

At the European level, co-generation is a perfect solution for the principal objectives of the European Commission. Thus, the Community directive on the liberalisation of the electricity markets requires, since last February, members of the Union to open their market by at least 25% and to achieve 33% by 2005. The majority has already gone further and for some, this opening is total. In this context, co-generation represents a significant alternative solution stimulating competitiveness between producers, by facilitating reciprocal access to the networks. However a recent study of Cogen Europe showed that the technical conditions for connection and their costs remain extremely variable in Europe and constitute a considerable obstacle for the development of co-generation.

As for the European directive on the liberalisation of the gas markets, this is due for August 2000. Gas is the best fuel for co-generation systems as it does not require storage and is environmentally friendly; liberalisation will inevitably result in a reduction of prices.

Leroy-Somer and co-generation

Leroy-Somer is one of the world leaders in the field of the alternator production and presents the widest range of the market: from 1 to 25000 KVA, low, medium and high voltages, speeds from 300 to 3600 min-1.

For co-generation application, Leroy-Somer supplies the PARTNER LSAC range, low voltage, 4 poles and medium voltage POWER LSA range or high voltage to 15000 V (375 min-1 with 1500 min-1).

Several thousands co-generation installations have been operating for many years, with Leroy-Somer alternators combining various systems of drive - gas engines, gas and vapour turbines - with powers reaching 15 Mva.

These alternators are designed and studied in order to produce the maximum KVA from the drive system. Winding, magnetic steel and the cooling circuit are optimised using special software. The alternator is selected for the power range giving the highest output with the best efficiency.

The mechanical and electrical design of the Leroy-Somer alternators results in a product with remarkable reliability. The useful power is generated with a temperature rise well below that allowed by the class of insulation utilised. The bearings are oversized; consisting of limited numbers of components, which enhances the life cycle and reduces operating expenses.



Denmark - Installation at Hvide Sande in 1994-95.
 Manufacturer of the power generating unit: Enmaco Motorer A/S - CATERPILLAR dealer.
 Gas engine type CAT G3616 SITA.
 Alternator LSA 56 UL 95 / 6 poles / 3845 kW / Medium voltage / Cos phi 0.9.



Italy - Food industry.
 Installation of co-generation for the company Inalca de Castelvetro in Modena consisting of a Leroy-Somer LSA 54L9 - 3400 KVA - 1000 min-1 - 3300 Volts coupled with an Ulstein-Bergen gas engine.

COGEN Europe

COGEN Europe is an association based in Brussels, close to the European institutions, and whose objective is to promote the co-generation in Europe. Its role is to support its members in the development of co-generation and to represent them at the European authorities. COGEN Europe represents nearly 200 members in 30 countries.

For all additional information on the co-generation in Europe, you can consult the Web site of COGEN Europe: www.cogen.org

France - Chemical industry Group turbo generator (co-generation) delivering an electric output of 6,8 MW, of which 4 MW is used for the production process and the remainder, is returned to the network. Manufacturer: Tuma Turbomach SA (Swiss)

Holland - Co-generation Project of Polders. Two gas engines drive the pumps. Recovered heat is used in the local industrial zone. When pumping is not required, the generator produces electricity that is resold to the national producer.



Success in optimising specific power

Specialised in the design and manufacture of refrigeration systems for trucks and commercial vehicles, Thermo King found in Leroy-Somer a preferred partner to assist in the development of electrical motorisation of its products.



The Thermo King refrigeration systems are manufactured especially for the transport of foodstuffs. The guiding principle is relatively simple: a diesel engine drives the refrigeration compressor and fans, using a set of pulleys and belts. Entirely autonomously, this engine provides the mechanical energy for the system when the vehicle is on the road. However, environmental legislation forces the lorry drivers to turn off the auxiliary engine when the vehicle is stopped. Thermo King had to face a new challenge: to maintain the compressor drive and the various accessories, when the truck was stopped.

It was a question of converting the only energy available, the electricity supply, into the mechanical movement necessary to drive the whole system. This operating mode, well known in Europe as "standby mode" requires significant know-how. It was quickly apparent that Leroy Somer seemed to be the only potential partner able to design a drive solution, perfectly adapted to the Thermo King specification and able to ensure a worldwide support (technical, commercial, logistic...).

Leroy Somer particularly concentrated its effort on the specific power: to improve the efficiency of the engine and to ensure the best possible dissipation of losses. The main principle is to cool the motor at the hottest part, which is in the core of winding and of the rotor. Leroy-Somer chose an "open winding" motor, of type IP23 or ODP which is more commonly used in the USA than in Europe, where apart from pumps and compressors, the applications remain rare.

Moreover, to scrupulously meet the precise specification, the motor underwent many adaptations. For example, the development of a dou-

ble air flow distribution increasing the internal air volume in order to reduce the active part of the motor and thus to improve the output and the specific power of the motor.

By producing this "symmetrical" motor (see photo), utilising two shaft ends, one for the compressor drive and the other for the fans, Leroy-Somer demonstrated once more, its innovative electrical and mechanical design capacity. Examples of this are in the inclusion of integral compressor mounting points, adaptation of shafts and bearings to the transmitted power and a multi voltage winding conforming to international requirements: 200-400-460 Volts, 50, 60 Hertz. The service of a world leader.

T H E R M O K I N G

Thermo King is a worldwide manufacturer serving a global market. A subsidiary of the international group Ingersoll Rand, the company has fifteen factories, located in nine countries and is able to distribute its products everywhere in the world.

Thermo King not only designs and manufactures refrigeration units for trucks, caravans, trains and sea containers but also systems for air conditioning buses, trains and urban public transport.

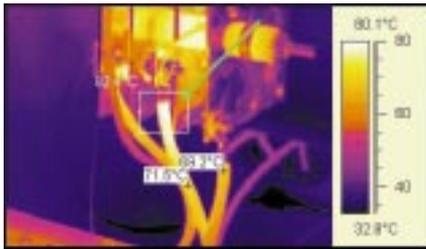
The challenge for Thermo King, is to ensure, under all circumstances that temperature is controlled no matter if the customer is in the heart of a large city, in the desert or the middle of nowhere, and benefit from an identical service and quality of product second to none.



Leroy Somer UK approved service centre strategy - New approval

Following the launch of the new Leroy Somer service centre strategy we have further strengthened our resource base with the approval of DORLEC Ltd as a Service Centre.

Based in two centres Chesterfield and Clay Cross the company has over fifty years experience offering a comprehensive Electro-mechanical installation, repairs and maintenance service to a host of well established manufacturing and process industries in the country.



The modern resources that are essential to support the Leroy Somer after sales strategy include dynamic balancing, load simulation motor test beds, condition monitoring, predic-

tive maintenance, vacuum pressure impregnation treatment in addition to full rewind and repair facilities of AC and DC motors and systems.

Teams of highly trained engineers are available 24 hours a day all year round to provide a complete engineering service with accreditation of ISO 9002.

The appointment further supplements Leroy Somer's ability to offer a total service package and the much sought after Total Asset Management programme that our user customers are beginning to expect.



UK INFORMATION

Leroy Somer Ltd
Heathrow Interchange
Bullsbrook Road
Hayes - Middlesex - UB4 0JR
leroysoomer@leroysoomer.co.uk
Tel: 0181 756 7000
Fax: 0181 756 7028

LEROY SOMER celebrates 40 years



The LS(UK) story starts at the end of 1959 when, as part of the strategic International development following the creation of the EEC, Leroy Somer decided to invest in export sales. From relative humble beginnings 40 years ago LSUK is now recognised as a major supplier of electric motors, alternators, gearboxes, variable speed drives and systems to UK industry.

Leroy Somer UK presence in 1959 began with just two people sharing a small office in Central London. Progress was steady during the early years and "LS" gained a reputation as a supplier of innovative product during the period of strong growth in trade in the late 60's and early 70's. This success led to a move to larger premises in Hayes, Middlesex with warehousing facilities.

This marked a period of rapid expansion world-wide for Leroy Somer, during which time new factories were being added in France almost every year and the company became European leader in it's field

A significant development in the UK came in 1974, when a northern office was opened in Skelmersdale, Lancashire to where the headquarters were relocated and a service depart-

ment and assembly facility created to support the needs of it's rapidly expanding customer base.

This rapid rate of progress was only slowed by the oil crisis of the late 1970s when manufacturing industry was badly affected by rising energy costs and falling demand.

Even during this difficult time Leroy Somer continued to grow in stature, increasing its presence through its innovative "total solution" approach, allowing customers to benefit from an integrated product range.

The company established itself as a major supplier to key industries such as air, liquid and materials handling and quickly outgrew its UK facilities, moving the headquarters in 1984 to Uxbridge, Middlesex.

With two further moves to keep pace with the growing customer demand (sales doubling every 5 years) the headquarters moved two years later to substantially larger premises at West Drayton. Until then, most of the activities had been based on sales of electric motors but the additional office and warehouse space enabled the company to set up a gearbox assembly facility to serve a growing demand.

Skelmersdale continued its commercial activities in the north of England, acquiring new premises as a result of a fire and became the spares and service centre for the UK. Taking advantage of this enforced relocation LS was able to support a major new customer to launch a local assembly before transferring to a permanent site. All part of the service!

Leroy Somer continued to work hard in the UK electric motor market and by the late 1980s became established as No. 2 in the UK

Increased sales and marketing effort significantly increased the company's profile and by 1989 annual sales had hit £10M and a party, complete with a cake, was held to mark this milestone.

Leroy Somer joined the US group Emerson Electric the following year and in 1996, having again outgrown premises, the company moved its headquarters to its current home in Hayes,

The rapid movement towards industrial globalisation has given a further impetus with LSUK providing strategic local service in response to the critical needs of our multi-



in the UK



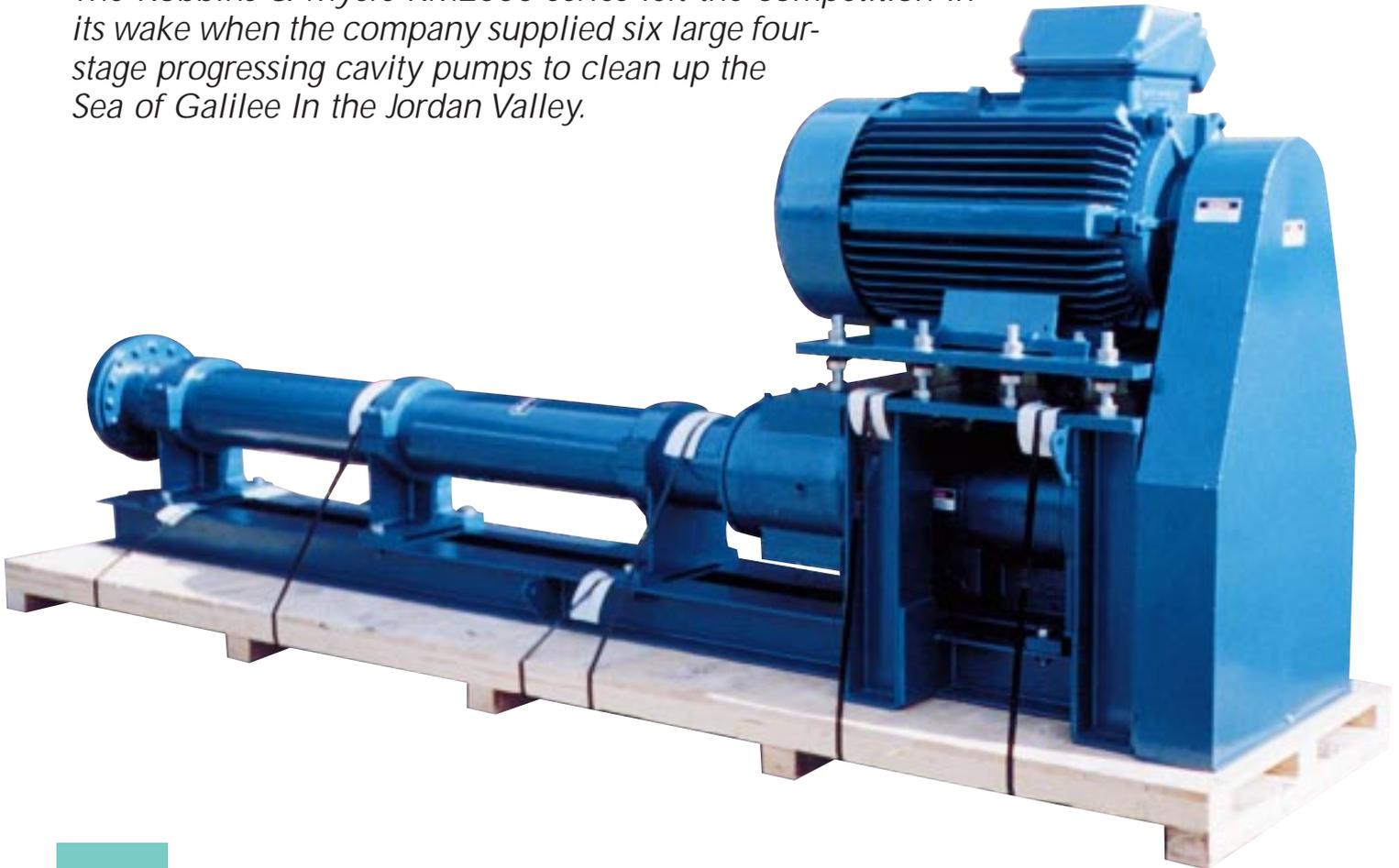
national customers. Now established as the leading European electric motor supplier to the UK market of standard products adapted to suit customer's needs and with a significant and expanding share of the market for gear-

boxes, alternators and variable speed drives, Leroy Somer cannot rest on its past success. Customer satisfaction can be the only true measure of our success. The dedication of LSUK to the future integration and manage-

ment of the complete industrial and commercial process will ensure that our customers, current and future, can look forward with confidence to the next 40years.

Water Treatment

The Robbins & Myers RM2000 series left the competition in its wake when the company supplied six large four-stage progressing cavity pumps to clean up the Sea of Galilee In the Jordan Valley.



The work was completed ahead of the influx of visitors to the Holy Land in the new year, which marks the 2,000th anniversary of the birth of Christ.

The pump-sets, each weighing more than three-and-a-half tonnes, are perfectly suited for pumping raw sewage from the existing outfall station to new treatment works nearly two kilometres away and 100 metres above the surface of the lake.

Five duty pumps plus one standby, each driven by Leroy Somer 132kW FLSC cast iron motors, operate in parallel to deliver a remarkable combined flow rate of 760m³/hr against a discharge pressure of 15 bar.

Because of their unique hollow drive shaft design, the RM2000 pumps are two metres shorter than the competition. This enabled the authority to save costs on site construction and was a significant factor in securing the order.

Space restrictions also meant that the Leroy Somer motors, running at 1,000 rpm and weighing over one tonne each, had to be mounted above the pumps, piggyback style.

An inherent risk with this configuration is vibration and the customer was concerned that this was kept to an absolute minimum to avoid damage to pipework and foundations. Senior application engineer Martin Snow said: "Our design and manufacturing team rose to the challenge magnificently. The finished product provided a very strong, stable platform which supported the pump and motor while accommodating the belt tension adjustment mechanism in a simple, innovative way."

The Leroy Somer motor is particularly well suited for this application due to the high corrosion protection and the low levels of vibration resulting from design and manufacturing methods to providing the highest levels of concentricity.

The RM2000 units exceeded the required performance criteria during witness-testing trials in the USA where they are manufactured. "The pumps exceeded all expectations and the clients were thrilled," said Martin. "We're the world leader in progressive cavity technology and the clients were very impressed with our performance and our facilities. We're expecting more business from Israel as a result of this project."



The Charles Quint tapestries “Los Honour” in Belgium



As a world premiere, the Patrimonio Nacional of Segovia is exhibiting for the first time outside of Spain and amongst the exhibits, the jewel of Flemish tapestry. This main event commemorates 500 years since the birth of Charles

Quint during 2000, “Los Honores” recalls the educational program of the emperor.

The first half of XVI century is a revolutionary passage from the Middle Age to Modern Times. The Vlaams Keizer Karel Committee 2000, organiser of the 500th

Anniversary of the birth of Charles Quint, felt the occasion needed to draw the attention to the general public the significance of this time “looking at the future in the rear view mirror of the History”.

Publicised by the press as a whole, this imposing project which began last year continues this year through a multitude of cultural events on a grand scale in Antwerp, Brussels, Ghent, Leuven and with particular accent on Malines during this year. It is in this city that Charles Quint spent his youth, educated by his aunt Marguerite of Austria who governed the Netherlands until the maturity of the young Charles. The city boasts the largest number of vestiges of this time and which has the largest number of preserved buildings in the whole of Flanders.

This extraordinary collection of tapestries “Los Honores” totals 420m2 surface area and is made up of nine pieces of work each one measuring nearly 10 meters by 5 meters.

Woven from wool, silk, gold and silver wire, these tapestries were created in the workshop of Pieter Van Aelst in Brussels to celebrate the induction of Charles as Germanic Roman Emperor on October 23 1520 in Aachen.

“Los Honores” demonstrates the great moral precepts of XVI century and evokes the virtues

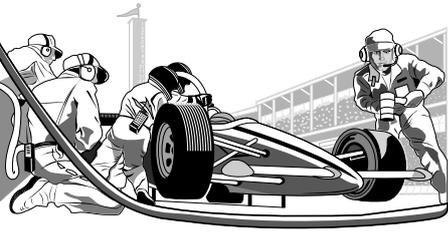
and the sins that the young sovereign must take particular regard to in order to obtain the supreme reward: Honourability.

The tapestries reveal a true Imperial educational program conceived by the Malines tutors of Charles Quint: the key words being, Faith, Glory, Nobility, Fortune, Fame, Prudence, Vice and Justice. Mythological, biblical and historical characters (princes, poets and philosophers) are amongst the scenes.

A particularly interest of these tapestries was that, Charles Quint took them with him wherever he visited : they were hung on the walls of the convent or a palace a few days before each arrival. These mobile frescos raised imperial prestige. They finally ended their peculiar travels in Spain and later became the property of Patrimonio Nacional in Segovia.



“Formula 1” in the heart of the factory



Plant manager of Mansle.

The factory of Mansle, one of the five factories of the IHP division (Integral Horse Power) of Leroy Somer, has during recent years, undergone a true metamorphosis, challenged to achieve total quality! This vast project relates to all the components of the company. To speak about it, we met Philippe Chavanes,



Today Leroy Somer is engaged in a permanent progress plan based on total quality. This approach integrates not only the conformity of the product to specifica-

tion, but also the whole process, that is to say, reduction of the costs, reduction in stocks and finally, the standard of services offered. Philippe Chavanes explains, “In today’s market, the customer, expects an adapted product with a high added value, at the lowest price and has come to demand absolute respect of the delivery time. The production of the end product must include, more and more, the ability to be integrated directly into the production flow of the customer, at the precise moment it is needed.”

Progress commitment

The permanent progress plan based on total quality requires a revolutionary design of the organisation, as well as the structure for man-

ufacturing motors and the motivation of the personnel. As it is today, the Mansle factory consists of five completely autonomous workshops, retaining a human dimension. These maintain between them a customer supplier relationship in the same way as the customer factory relationship. Such a redesign of the organisation suggested everybody should be committed to progress, totally involved in all aspects of the business. In addition, a vast information system was set up. The factory is displayed! tables show the principal production indicators -objectives of the progress plan, a status report of the orders, the daily productivity of each workshop and the deadlines to be kept. Each workshop is the same, at a glance, we have a precise picture of the progress of the product in the production chain. In parallel, quarterly meetings are organised for all personnel - the objective is to put on the table all current problems to resolve.

Tools of success

Generally, the annual improvement in the productivity rate of each workshop is 2 to 3%. Leroy Somer set up methods which allow, when it proves necessary, to carry out “localised special progress improvements” (about 15 to 30%) before resuming the normal progression. To aid this action, the personnel of the factory have a toolbox, of various Japanese methods such as KANBAN, SMED, TPM or HOSHIN.

The factory under labels

Determining customer requirements in advance is not an easy matter to achieve. In addition, the primary tool already used in several Leroy Somer factories is the KANBAN (the label) which reduces the levels of management required for repetitive production. The starting point is to know the actual consumption of the components in order to replenish the stocks of the basic components further upstream. This reverses the traditional production flow technique from a push to a pull system. Using a system of labels or labelled bins, the station “customer” indicates with precision to the “provider” the necessary quantity of parts to be supplied. This process offers not only more rational use of the working hours but also an immediate vision of component consumption by the customer at each level of production - cutting, casting, winding, machining and assembly.

At the starting grid

Reducing stocks implies a multiplication of small production series, which requires a rapid production tool change and calibration. In Mansle, in the space of ten years, the rapid change of production series has strongly evolved. Previously, tools changed, for example, once a week and that could take several hours. With the SMED (Single Minute Exchange Die), the team is subjected to performances close to Formula 1, as a maximum 9 minutes deadline is imposed to carry out the operation. By recording all operations on a video film during a production series change, unnecessary operations are able to be eliminated and make it possible to be more reactive to the actual needs of the customer.

Predict the breakdowns!

Breakdowns, malfunctions, adjustments and the various abnormal operations of a machine put at risk the total production. These “events”





efficiency. Largely inspired by the expertise of the automobile sector, the HOSHIN method imposes on the team an almost commando operation, to modify the availability of the machines in the space of one night (or over a relatively short time). A photograph of the workshop makes it possible to study with the personnel concerned the ideal utilisation of machinery to eliminate the waiting time. This analysis takes into account the optimum organisation of workstations, removal of con-

The “total” victory

This policy of “total quality” involves the company at all levels to permanently question actions and procedures.

The customer subsequently benefits the most. Leroy Somer doesn't intend to stop here, the seeds having been sown for an information system within the different factories, the company believes today that it is essential to keep customers informed regarding the progress of their orders.

In the end, give the customer access to this information simply through connection to the Leroy Somer web site, why not!!



can sometimes paralyse up to 40% of the initial production volume of a machine. Two options - to replace or to face lift which is definitely more advantageous from a cost point of view, for the factory and the customer.

The TPM (Total Productive Maintenance), launched three years ago at Mansle, identifies the bottlenecks in the production chain.

Following this, an analysis report is made of all stoppages and their cause for each machine. The direct involvement of the operators to the resolution of the problems generally makes it possible to detect the principal recurring breakdowns and to make significant gains from increased productivity. These gains being directly reinvested into the policy of preventive maintenance in order to anticipate future problems.

Operation commando

Establishing an improved process is expected to increase performance in terms of time and

veyors and the waiting time which result from these. All unnecessary handling or operations are discarded and the production flow is enhanced!

At the same time, errors or malfunctions are not accepted any more.

Order Congestion

The remaining tool is the REENGINEERING, mainly applied to the services, for example the order processing circuit. An accurate analysis of the passage points of the orders and their duration was carried out. The aim being to emphasise the blockage points and to work out solutions suggested by each person in the process. Thus, the order processing time for a new product, which previously took 5 days was brought back to 2 days. As for standard products these are treated in flow, within minutes of their receipt.



Editor in chief :

Jean-Michel Lerouge
Leroy-Somer
Bld Marcellin Leroy
F-16015 Angoulême

Co-ordination and layout :

Corporate Communication

Editorial committee :

Fr. Galais, A. Galloway, P. Hellstrand,
R. Lamprecht, J. Laureys, M. Oosterlynck,
O. Powis, A. Rostain, G. T. Sorensen,
V. Viccaro.

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<http://www.leroy-somer.com>