HIGHER TECHNICAL INSTITUTE
MECHANICAL ENGINEERING COURSE

DIPLOMA PROJECT

A SURVEY INTO COMPRESSED AIR INDUSTRIES

M / 906

BY

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JUNE 2000

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Submitted to the Department of Mechanical Engineering of the Higher Technical Institute

M/906

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JUNE 2000-05-28

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Report Project

Submitted to the

Department of Mechanical Engineering

Nicosia-Cyprus

In partial fulfilment of the requirements for the diploma

of

TECHNICIAN ENGINEER

IN

MECHANICAL ENGINEERING

JUNE 2000-05-28

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ACKNOWLEDGEMENT.

I would like to say a special thanks to all the persons who gave substantial assistance to me and helped me to meet the target, finish the project correctly. This persons where my father, mother, my supervisors Mr Paraskevas Demetriou, and the personnel of two companies that I've made my training Atlas Copco Ltd and Nemitsas Ltd.

Tiris Apostolos

" A Survey into Compressed Air Industries"

The purpose of the work is to reveal the importance of utilisation of compressed air as a means for producing work instead of the usual ways (electricity, fuels, etc) so as to accomplish increased efficiency in comparison to our present methods.

By studying the proper sources of information about the objective of the project, books, manuals, advertisement, liflets the target, which was to conduct a survey into compressed air industries, was met.

Introduction.

Many technical applications derive from the primitive state of mankind. For example, the first application of compressed air was blowing on cinders to make them flare up into a live fire. The air used for blowing was compressed in the lungs which may be regarded as a "compressor" provided by nature. The capacity and performance of this compressor are quite impressive. The human lugs are capable of processing 100 litters of air per minute, or 6 cubic metres per hour, and they exert a pressure of 0.02 – 0.08 bar. In its healthy state this human compressor is an excellent in reliability, and the service costs are nil. The question might be asked how our culture would have developed if our aspiration apparatus has not been capable of assistance in making up a fire.

But the human compressor proved entirely inadequate when mankind more than 3000 years B.C. began to melt metals like gold, copper, tin and lead found in pure form in nature. To reach the temperatures needed – in excess of 1000°C – a mightier compressor was required, but this one was also provided by nature, namely the wind compressed against a hillside and ascending over a ridge. Egyptian and Symerian goldsmiths invented a more convenient and reliable means of compressing air for the blast they needed to melt their noble metals. They used a blowpipe and so indeed do their colleagues today.

The first mechanical compressor the hand operated below, was not invented until the middle of the third Millennium, and the much more efficient foot-belows did not come into use until about 1500 B.C. This

might be considered as the birth of the compressed air.

To find out when work capability of compressed air first was used we must go back many thousand years to the day when the first hunter had tried out a blow-pipe and arrow for game killing. It is almost unbelievable what a range and precision a primitive man can obtain with such a weapon.

The use of compressed air as a medium of energy transmission began to be discussed in earnest around 1800 when it had been found that steam, owing to its rapid cooling and condensation, was limited to very short distances.

But the first successful large-scale transmission of energy in the form of compressed air took place in connection with the advance of the Mt.Cenis tunnel in the Swiss Alps. This was a double-track railway tunnel with a length of 13.6 km. The work began in 1857 with manual drilling at a rate of advance that would have finished the job in 30 years. Therefore, already at the outset, the pneumatic rock drill and compressor operating at a pressure of 6 bar. After four years, compressors built along two different lines were installed at both portals of the tunnel, and rock drill designed by Germain Sommeilles chief engineer of the tunnel was available for operation.

It is interesting to not that both compressors were of the wet type, i.e.water was used to cool the air inside the cylinders.

During the years followed compressed air had to compete with electric power in numerous fields of application, and became a necessary complement to electricity to many more.