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**EVOLUTION AND DEVELOPMENT OF MACHINE-TOOL MANUFACTURE
FOR METAL-FORMING OPERATIONS IN ARGENTINA**

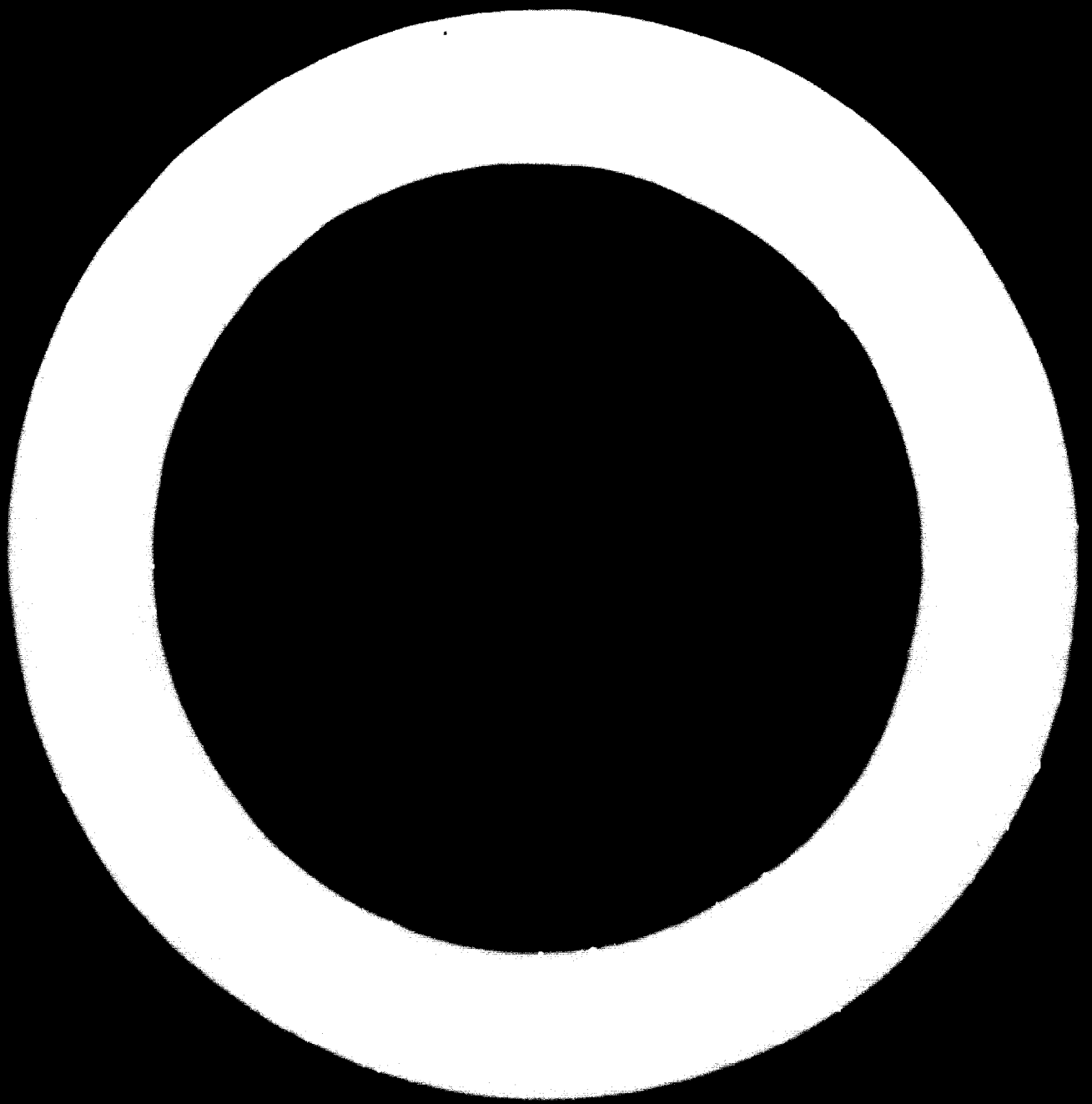
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1. INTRODUCTION

1.1. Background

The aim of this paper is to present a succinct report on the evolution of metal-forming machine-tool manufacture as it has developed over the last few decades in Argentina.

It is important to note in any inquiry concerned specifically with this kind of equipment that trends in its manufacture run parallel to the trends created by demand in other areas of mass production, with the one an obviously necessary precondition for expansion in the other.

This report deals with the kind of equipment required for medium- and large-scale production.

2. ANALYSIS OF THE STAGES OF DEVELOPMENT AND THEIR SPECIFIC CHARACTERISTICS

2.1. Initial period (to 1950)

Metal-forming machine-tool production of a simple kind began in Argentina as far back as the 1930s (Arrigoni, Catita, Merlini, Pino).

Other needs, particularly for more sophisticated and advanced equipment, were met by importing from abroad.

This was also a period when a certain number of machines were manufactured by firms for their own use; mention might be made in this connexion of occasional production by such firms as Siam de Tella, Centenera, Metalroca, Gema, and others.

The shortages in import supply created by the Second World War together with the increased needs which emerged during that period led local producers to enter this sector with varying success. It was during this stage, which runs through to about 1950, that the first domestically produced equalising beams, hydraulic presses, friction presses, guillotines, bending machines, pile drivers, flangers, etc. made their appearance in the market.

All of this equipment is used in medium-scale industrial production.

Along with increased demand for and production of hand-operated equipment, there was also a fairly good supply of other, heavier and more complex, machine tools. The brands available on the market during this period included the following: Arrigoni, Adabor, Catita, E.M.I., Nova, Pino, and certain others. The best developed and most extensive product line was equalizing beams with cast-iron housings.

2.2. Period of evolution (1950 to 1960)

With considerable ups and downs, the 1950-to-1960 period saw increased activity in the area of light metallurgy and a consequent increase in the demand for new types of metal-forming equipment.

In addition to stamping and extrusion machines, a need developed for formers and cutters. Competitive production of guillotines, bending machines, and hydraulic presses was started.

Because of market fluctuations, a certain number of firms manufacturing machine tools disappeared or changed over to other product lines, while new companies sprang up to fill the gaps and meet the demands of the market.

Within this period the following new producers, among others, came into being and succeeded in gaining a firm foothold in the industry: Daisa, El Galeon, E.M.A., Famag, Imka, Iturrospe, Le Barillier, L.B.C., Puma-Técnica, P.Y.S., Serma, Tima, et al..

Fiscal policies in support of agriculture and the farm-machinery industry, such as tax relief for capital investment and medium-term loans for the purchase of machinery, along with the upturn in construction and public works from 1960 onwards, played an important role in this production sector.

It should be noted at this point that, displaying a high degree of confidence in Argentine industry, the farm-machine manufacturers became the principal users of domestically produced machine tools.

2.3. Period of technical consolidation (1960-1970)

The establishment in the country of an automobile assembly industry, with the consequent need for broad-based support activity for the supply of parts and components, gave rise, because of the standards of quality and precision set by such an industry, to great changes in the range and type of tools to be supplied by the sector.

To meet these demands, domestic producers were forced to make rapid progress, so that this period saw the expansion of plant, the acquisition of heavier equipment, and the development of more advanced technology.

This trend found public expression in the many machine-tool exhibitions held during this period. It is important to note that at the third such exhibition, held in 1968, the variety, capabilities, complexity, and finish of the equipment on display gave a clear indication of the ability of this sector to satisfy not only the needs of the domestic market, but also certain foreign requirements as well. The progress that had been accomplished to that point and the promise that it held for still further developments to come were in fact confirmed at the Fourth Machine-Tool Exhibition held in May 1971.

At this last-mentioned exhibition manufacturers engaged in this branch set up very spacious display areas, and their exhibits were the largest shown. Among their features were automation devices, pneumatic, hydraulic, electronic and mechanical drive equipment, programming systems, and ancillary motor-driven and automatic accessories.

For the first time there was displayed a machine for rolling plate up to 16 mm thick; production of such a machine on a regular basis, was essential if the industry was to meet demand. In the area of bending machines and guillotines, in addition to the conventional models, hydraulically powered machines were also shown, with particular interest centred on a plate-shearing unit capable of handling work of as much as 25 mm in thickness and 3000 mm in length. This item in particular was indicative of the technological capability attained by the domestic industry.

Also prominent, at this same exhibition, were variously rated hydraulic and mechanical presses, among the latter some built of low-carbon steel plating, with pneumatic clutch, automatic feed mechanisms, and high operating speeds.

3. CONCLUSIONS

3.1. According to statistical data, the share of the metal-forming sector in Argentina's total machine-tool production amounts, in monetary terms, to some 45 per cent. This figure, to which we might also add the fact that there are more than thirty firms engaged in this area, gives ample testimony to the importance and development achieved in this branch.

It is legitimate to state that the metal-forming machine-tool industry in the Argentine Republic is now sufficiently developed technologically, with an adequate plant and industrial base, not only to meet all the requirements of the domestic market, but even to satisfy foreign orders on an internationally competitive basis.

3.2. Of the equipment most in demand and produced in the largest quantities, the following units might be mentioned, along with their basic parameters:

Equalizing beams - Series are in production of up to 200 tons power to cover all requirements.

Hydraulic presses - The industry meets the demand for metallurgical, wood-working, plastic, rubber, and other applications with ratings of up to 1500 tons from regular production. In addition, special-purpose machines are produced to special order, there being one case, for example, in which a 7000-ton unit was manufactured jointly by the producer and customer.

Mechanical presses - These units are in regular series production with ratings to 500 tons, with special models to 800 tons now in the design stage. Also in the process of development are high-speed machines, machines of the one- and two-rod varieties, with open-face design, with four columns, with moving table, pneumatically cushioned, inclinable, etc.


Guillotines - The industry meets the demand for conventional models for machining sheet to 25 mm in thickness with lengths ranging to 6000 mm. This equipment is supplied with mechanical, pneumatic, and hydraulic drive systems and with a variety of automatic accessories and devices.

Bonding machines - Every variety of requirement is fully met with serially produced and standardized models to 700 tons and table sizes of 6000 mm. Special models have also been produced: tandem machines of up to 8000 mm; models with automatic feed mechanisms for the perforating and grooving of plate; models with mechanical, pneumatic, and hydraulic drive systems and a variety of automatic devices. The industry has the capability, should the need arise, of producing this equipment with ratings up to 1000 tons power.

Annex 1 lists all the varieties of domestically produced equipment in this sector.

ANNEX 1

Equalising beams
Mechanical presses
Hydraulic presses
Friction presses
Bending presses
Guillotines
"Pyramidal" and "pre-curved" rollers
"Manual" and "motor-driven" flangers
Upsetting forging machines
Forging presses
Pile drivers
Pressur-stress relievers
Slitters
Circular cutting shears
Punching machines
Gang shears
Billet shears
Roller-type profiling machines
Tube and bar benders
Sheet stretchers
Manually operated shears
Complete packaging line
Free-fall press
Others





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