東北電力株式会社
片門発電所全景

THE RECORDS OF HITACHI'S PROGRESS IN 1953

LOOKING back over one year of the engineering activity by Hitachi, Ltd. we take pleasure first in announcing that the Company's accomplishments in its every field of manufacture have been so illustrious as to outshine the flourishing business that had been enjoyed in prewar days. Almost a host of large machines for power generation and transmission as well as for power house construction were completed at and delivered from the Hitachi's factories to meet a gloval demands principally derivative from the proceeding nation-wide power source development project; among those, 70,000 kW Francis turbine coupled with a 72,500 kVA alternator built for the Maruyama Power Station, Kansai Electric Power Co. stands foremost in capacity only matched by another gigantic product for thermal plant, 67,000 kVA hydrogen-cooled generator and 55,000 kW turbine for its drive which were supplied to the Ushioda Power Station, Tokyo Electric Co., both being record-making product of the year. Long-lasted study by Hitachi engineers on the cavitation phenomenon in the waterwheel have been valued high in the construction of 13,000 kW Kaplan turbine of the Himekawa No. 3 Power Station of Chubu Electric Power Company, utilizing 55 m head. Another research of Hitachi's engineers concerning high temperature and high pressure of the turbine is making a significant contribution in the construction, recently started at Hitachi, of the installation of No. 2 Tsurumi Power Station of Tokyo Electric Power Co., the Japan's most specutaclar plant in many ways consisting of 280 t 92 kg/cm² 513°C boiler, 66,000 kW 88 kg/cm² 510°C turbine, 81,000 kVA 50 cycle 3,000 r.p.m. hydrogen cooled turbo-generator.

For the decision of the electric company to depend on the home maker in building

such momentous plant that requires a very high level of engineering to which only few world's top makers are qualified, Hitachi, as the leading electric machine maker of Japan, is making its best to complete the products of faultless performance and quality thus to deserve the user's reliance, and to testify to the capability being possessed by an indigenous maker.

The demand was also active for the equipments for transmission and substations; 135,000 kVA 240 kV 3-phase transformer under construction for the service at the Kamishiiba Substation of Kyushu Electric Power Co. will establish a new record in capacity when completed. Many a new design was incorporated in circuit breakers and other apparatus for switchboard use which were also in large demand.

The latest trend in controlling system has led to the strong preference to the extremely high efficiency device employing magnetic amplifier or rotary amplifier. In the development of this new controlling device the analyses which were made feasible by the aid of analogue computer were fully utilized in improving its accuracy; the device is doing much in the far effective controlling of equipments in iron foundries and paper mills and winding machines. This year has witnessed a successive increase in the capacity of mercury rectifiers of air-cooled single-anode system. To mention an example, 3,000 kW machine of this type was completed and started for actual service in the National Railways. It may be noted also that a 50 kV 1,000 kW mercury rectifier was trially manufactured recently as a useful tool in the study of the practicability of D.C. high tension transmission, with expectation for a material fruit in this important research.

In the field of material handling and transportation machine production, the electric source development project was also a source of brisk demand and a number of large-sized electric overhead travelling cranes headed by 400 t machine for the Maruyama Power Station have been completed. Also, a cable crane including 13 t crane built to the order of the Kamishiiba Power Station is rendering the competent service in dam construction. The high pressure compressor, 2,600 HP 300 kg/cm², suplied to the Nissan Chemical Industry Co. has made a postwar record in its ratings, incorporating the latest results of research as well as experiences dating from prewar days to attain such noteworthy characteristics as the adiabatic efficiency reaching 75.5% and the overall efficiency 71.3%.

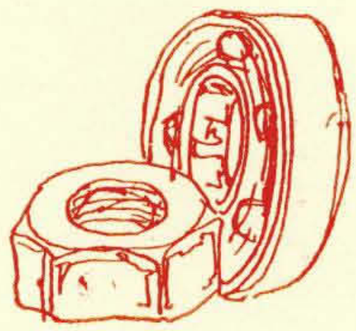
In the production of rolling-stock, Hitachi has added a glorious page to its history by building Type EF-5861 Locomotive for Imperial Use. Important orders for steam locomotives were from overseas countries, such as Formosa and Thailand, and further

cultivation of foreign markets, particularly in southern countries, is anticipated.

Last, but far from least, is the research into the communication apparatus, which has been directed widely over wire and wireless carrier communication sets, electron tubes whereby giving the birth to many new promissing kinds of miniature tubes, ultra short wave tubes, Braun tubes for television use, etc.

Besides the above-mentioned sections of production Hitachi organization covers a diversity of other manufacturing departments such as of electric wires and cables, iron and steels in the form of material and products, and inumerable other standardized machines and appliances in quantity production. And, in each of these sections, unremmitting study for the improvement has been materialized into novel types having larger efficiency and service value than before, thus serving greatly in their fields.

In reviewing the accomplishment in the past one year which was far more fruitful than any predecessors, it is our fervent desire that the Company should be given the same favour and cooporation by the users in the coming year, and their commenting on the above is cordially invited.



緒　　言

INTRODUCTION

昭和 28 年度をふりかえつてその技術の成果を顧みれば、この一年に於ける日立製作所の輝しき実績は戦前の最盛期を寧ろ凌駕するものがあつた。即ち電源開発を主体とした建設機械、発送変電用機器はその成果の送り出されたもの枚挙に遑なく、特に水力機器に於ける関西電力丸山発電所用 70,000 kW フランシス水車及び 72,500 kVA 交流発電機、火力機器に於ける東京電力潮田発電所用 55,000 kW タービン及び 67,000 kVA 水素冷却発電機はその双璧であつて、何れも本邦に於ける記録品であり、又水車の空洞現象に関する研究の成果は、遂に中部電力姫川第三発電所用 13,000 kW 55 m の高落差カプラン水車を製作する機会に恵まれ、又高温高圧に関する研究の成果は、東京電力第二鶴見発電所用 280 t 92 kg/cm² 513°C ボイラ、66,000 kW 88 kg/cm² 510°C タービン、81,000 kVA 50~ 3,000 r.p.m. 水素冷却タービン発電機よりなる本邦に於ける火力発電所設備の記録品の製作が開始される次第となつた。これ等特に高度の技術を必要とする製品を国産技術の研鑽に期待され、国内製作者に発註された需要者側の英断に対しては深甚の敬意を表さなければならない。

又送変電用機器の需要も頗る多量に上り、殊に九州電力上椎葉発電所用 135,000 kVA 240 kV 三相変圧器は本邦に於て製作された最大の変圧器であつて現在鋭意その製作が進められつゝあり、遮断器、配電盤機器も新製品が続々送り出された。

制御方式としての最近の傾向は磁気増幅器、回転増幅器を利用した高性能のものが多くアナログコンピユータに依る解析の結果がその精度の向上に大いに貢献しており、製鉄機器、製紙機器、巻上機等にその成果が見られる。又水銀整流器は風冷式単極のものが益々容量が増大され国鉄用標準として 3,000 kW のものが運転に入つた。又直流高圧送電の研究用として 50 kV 1,000 kW の水銀整流器が試作完了し今後この方面に於ける研究の成果が期待される。

荷役運搬機械としては、やはり電源開発関係のものが多く、丸山発電所用 400 t 天井起重機以下大型のものが数多く製作され、又堰堤築造用としてのケーブルクレーンは九州電力上椎葉発電所用 13.5 t 他各所にその偉力を発揮している。日産化学富山工場用 2,600 HP, 300 kg/cm² 高圧圧縮機は戦後の記録品であつて、戦前の経験の上に更に最近の新しい研究の成果が多分に織り込まれ、その性能は断熱圧縮機効率 75.5%, 全効率 71.3% という優秀な結果を得ることが出来た。

鉄道車輛に於ては EF-5861 号お召し列車用電気機関車を完成し、蒸気機関車としては台湾、タイ国向け輸出用のものが多く、今後南方方面への更に積極的な進出が望まれている。

通信関係に於ては、特に重点がおかれてその研究が行われ、有線機器より更に無線搬送機器へと、又真空管関係の生産並びに研究は新品種へ集中されミニアチユア管、超短波用真空管或いはテレビジョン用ブラウン管等の飛躍的な進出が期待される。以上の他、電線、鉄鋼等材料部門或いは量産を主体とする商品部門に於ても生産並びに製品に対する研究努力は着々結実し、それぞれの部門に大きな活躍をした。日立製作所の昭和 28 年度に於ける技術の成果を顧み、これ等多忙であつた一年間の実績をこゝに集約し、大方の御批判を賜り今後更に懇篤な御指導御鞭撻を仰ぐと共に我国工業技術研究の資料とし、この一巻を役立てゝ頂ければ幸甚である。