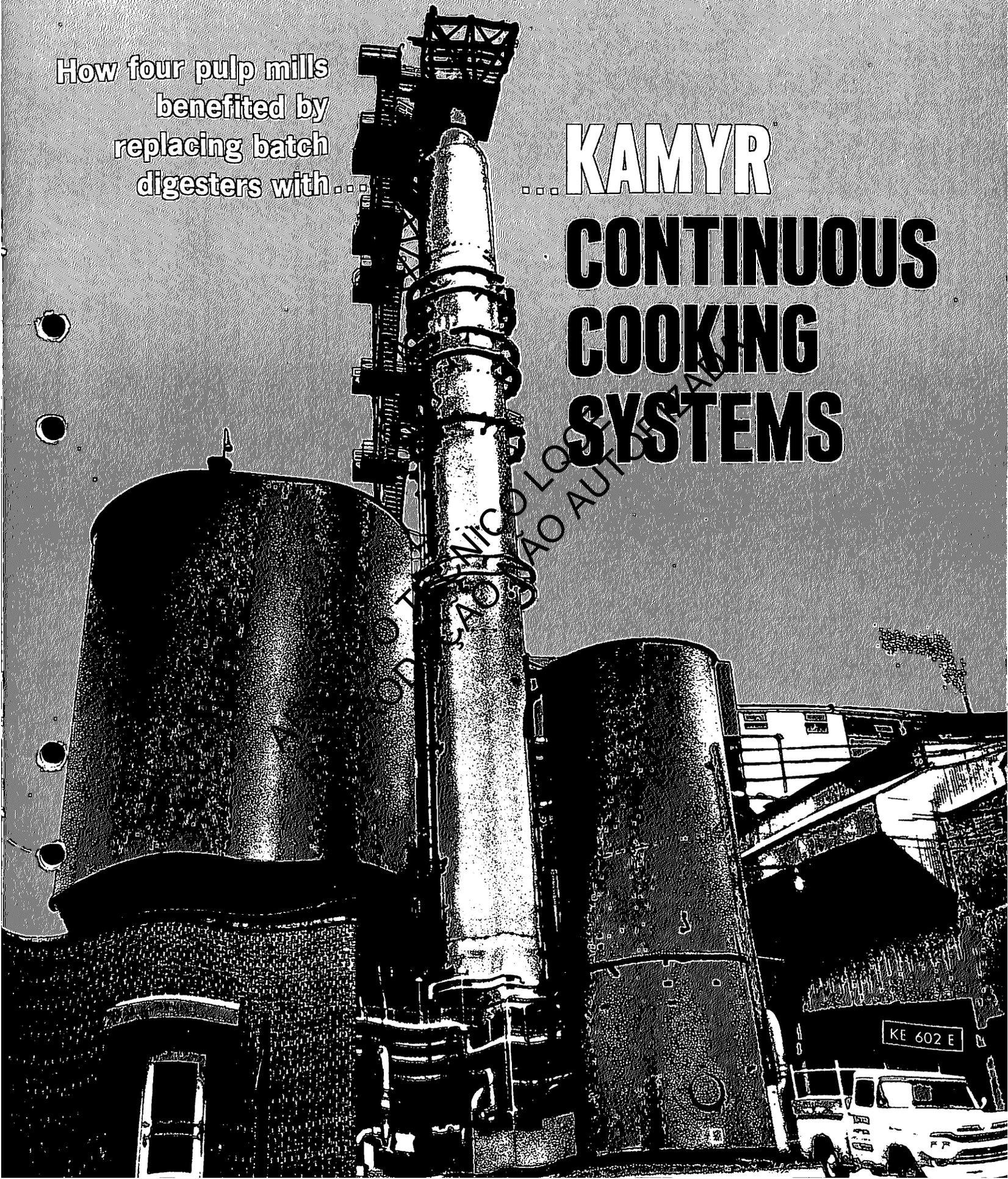
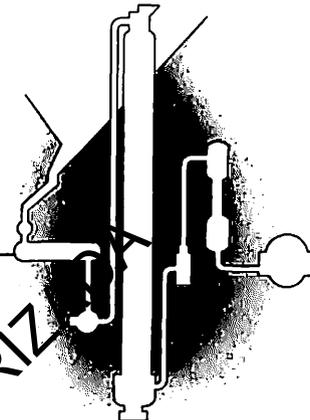


How four pulp mills
benefited by
replacing batch
digesters with...

... **KAMYR**
**CONTINUOUS
COOKING
SYSTEMS**



INTRODUCTION



This booklet shows how four prominent mills benefited by replacing batch digesters with a Kamyr continuous cooking system.

At three of these mills, batch units with considerable service life remaining were replaced with a Kamyr digester. These installations are included as indications that, even if your batch digesters are relatively new, your mill can profit from their immediate replacement.

This is possible because of the substantial operating cost savings and pulp quality improvements Kamyr continuous provides over batch. Such benefits were most clearly documented at the fourth mill (page 6), because a Kamyr digester directly replaced a batch system with virtually the same daily tonnage, type of pulp, and wood species.

Each year, improvements in Kamyr continuous cooking have been made, and new techniques added. The advantages of Kamyr cooking over batch are becoming greater. Even though your batch units have years of life left, replacing them with a Kamyr continuous digester will produce an attractive return on investment.

1

**Union Camp Corporation
Savannah, Georgia**

Kamyr cooking system

needs only one operator

Union Camp's Savannah mill—the world's largest—incorporates some highly efficient equipment. An example is the new Kamyr continuous cooking system. It requires the supervision of only one operator—from the chip feed through to high-density storage—under normal conditions.

Six batch digesters have been retired.

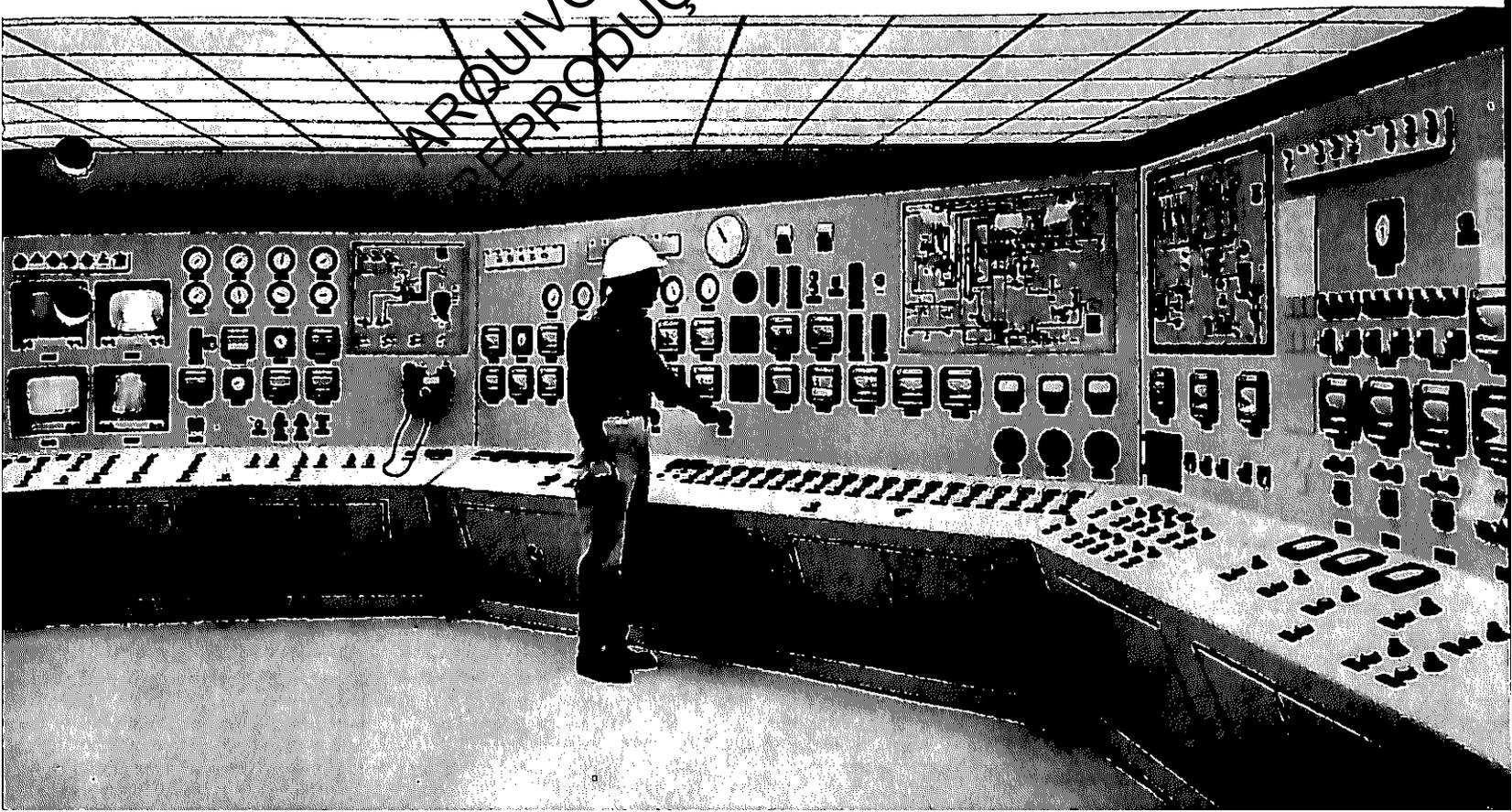
Using the control panel shown, the operator supervises the chip feeding, cooking, in-digester HI-HEAT* washing, refining,

screening, vacuum washing, and conveying to high-density storage.

Complete washing is performed by a combination of the Kamyr HI-HEAT washing, and the final rewash.

The conventional brown stock washing plant with vacuum drums is eliminated. The capital investment in the pulp mill building and equipment is substantially reduced, and less area is needed. This unbleached pulp mill building is only 72 ft. x 85 ft.

*Trademark, Kamyr, Inc.



2

International Paper Company Camden, Arkansas

Kamyr digester cuts steam consumption and cooking manpower, improves pulp quality

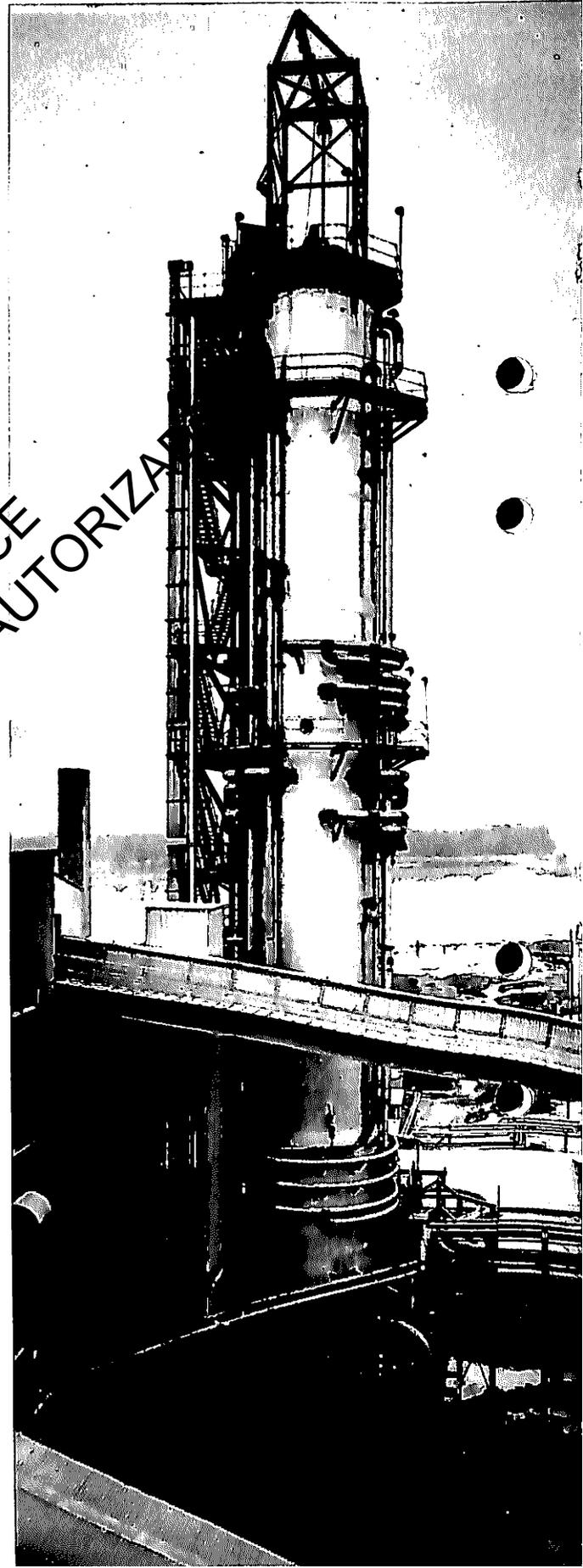
The entire pulp requirement for this mill is supplied by one continuous digester, a 700-T/D Kamyr unit started up in late 1963.

The batch units replaced had an estimated five to ten years of life remaining, but International installed the Kamyr system to obtain higher pulp quality and lower operating costs. The cooking, washing, and screening department controls have been incorporated into one efficient central control room.

As anticipated, the Kamyr digester provided pulp of higher quality than the batch units, with fewer operators required.

At the TAPPI Engineering Conference in Atlanta in 1967, International reported additional advantages of the Kamyr unit, as follows:

1. Less steam consumption (43% less cooking steam, 20% less evaporator steam)
2. Smoother steam flows with lower peak demands on steam supply
3. More condensate returned
4. Higher black liquor solids to evaporators
5. Greater flow of liquor to evaporators and recovery boilers
6. Higher electric power load and loss in kw generation from process steam, BUT lower average kwh/ton of pulp produced
7. Boilers can be operated at higher efficiency
8. Increased pulp and paper production with existing boilers



3

**Olinkraft, Inc.
West Monroe, Louisiana**

**Twin Kamyr digesters
provide cooking
versatility for
kraft paper and
board manufacture**

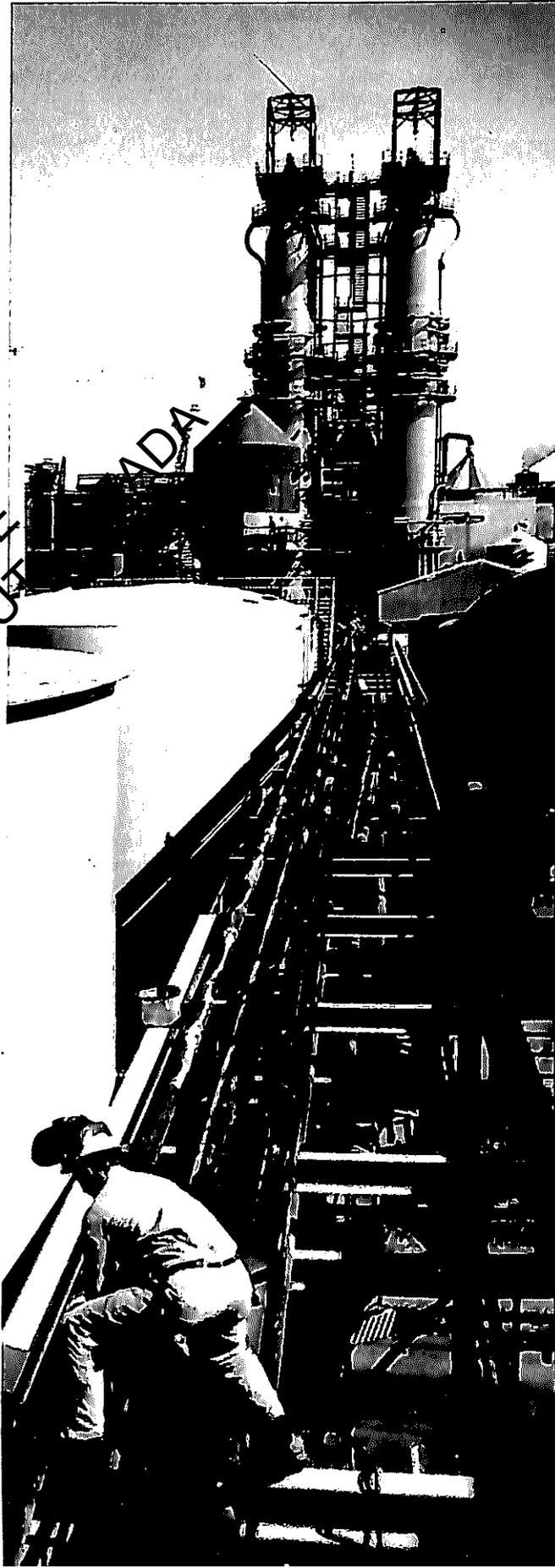
These two Kamyr digesters are part of a large modernization project completed at West Monroe in late 1965. They bring the total capacity of this multi-grade mill to over 1000 T/D.

The digester at right is rated at 447 T/D of high-quality pine kraft. The lefthand unit is rated at 519 T/D of higher yield pine kraft. From these two pulps, all major unbleached paper and board grades are produced.

The engineering studies performed in advance of the Kamyr installation indicated that the reduced costs, pulp quality improvements, and pulp versatility would justify replacement of the batch digesters.

One operator and one helper are all that are normally required for each of the two parallel pulp processing lines. Each line comprises a Kamyr digester, refiners, screens, two single-stage Kamyr drum washers, and high-density storage tank.

The ability of the Kamyr system to cook two pulps, tailored to preset specifications, enables Olinkraft to maintain the pulp blends for their wide variety of grades.



Consolidated-Bathurst Limited Wayagamack Division, Three Rivers, Quebec

Kamyr digester saves on steam and chemicals; improves pulp quality

The 300-T/D Kamyr digester at Three Rivers is noteworthy because it directly replaced eight batch units using the same wood furnish to produce the same types of pulp at identical total daily output. A basis of comparison was therefore available.

Data reported in *Paper Trade Journal* compared pulp quality and costs before and after conversion to continuous. Among the advantages listed for the Kamyr unit over the batch system were the following:

PULP QUALITY

The continuous pulp was more uniform. Significant pulp strength improvements were obtained, as indicated in the table:

	Batch	Continuous
Breaking length, meters	14,200	16,100
Tear Factor	85	91
Burst	96	108

SALTCAKE SAVINGS

Active alkali was reduced to 17 per cent in the Kamyr digester, from 20 per cent in the batch system. As a result, the Kamyr unit has reduced saltcake makeup by as much as 30 lb./ton. This commensurately

increases steam production, enhances capacity of the recovery departments, and reduces operational problems.

STEAM SAVINGS

There was no direct measurement of steam consumed by the batch system. However, the peaks in steam associated with the batch units were essentially eliminated. A conservative estimate indicates a saving of 2900 lb. per ton for combined digester—hot water requirements, and, at the evaporators, another 340 lb. per ton owing to the fact that the Kamyr system delivers black liquor to the evaporators at higher per cent solids than did the batch digesters.

REDUCED CORROSION

Consolidated reports little evidence of any corrosion in the entire Kamyr system, because of a permanent, tightly adhering protective scale. This report, coupled with results with other Kamyr installations, indicates an almost unlimited life for Kamyr kraft units. By contrast, Consolidated's batch digesters had required replacement after 15 years*, primarily because of corrosion.

*Some mills obtain as little as 8 years batch digester life.

Aerial view of Consolidated's mill at Three Rivers. Arrow locates Kamyr digester building.



How a Kamyr digester can build profit at your mill

The Kamyr continuous cooking system has been proved successful by the nearly 150 installations operating worldwide. Here are the benefits a Kamyr system can provide over batch cooking:

HIGHER YIELD AND BETTER PULP QUALITY

The inherent features of Kamyr continuous cooking: 1) provide greater uniformity of delignification throughout the chip cross sections, and 2) permit realization of full pulp strength potentials by their unique avoidance of mechanical degradation of the fibers. This virtually eliminates partially cooked or uncooked fiber bundles.

The improvement in uniformity is constantly maintained. It permits cooking for increased yield while obtaining the same or better pulp quality, even after bleaching. The result is significant wood savings.

EASES POLLUTION PROBLEMS

Extended-time HI-HEAT washing provides the potential to reduce substantially the saltcake losses to sewer. Your ponding and treatment facilities become more effective.

LOWER WASHING COSTS

Depending on overall economics and pollution control requirements, with three hours of HI-HEAT washing in the Kamyr digester, only one following vacuum washer is required; or with four hours of HI-HEAT washing, no vacuum washers. You shut down washers, saving on washer maintenance, power, defoamer, and labor costs. Moreover, four hours of washing time allows operation at full tonnage with no following washing during periods of washer outage.

REDUCED STEAM CONSUMPTION

Continuous cooking uses considerably less steam than batch. Steam demand at the evaporators is reduced because of lower liquor-to-wood ratio, indirect steaming, and less radiation loss. Indirect steaming and return of uncontaminated condensate reduces feed water makeup chemical costs.

LESS FOR BLEACHING

Fluctuations in bleachability of Kamyr cooked pulp are smaller and more gradual than for batch. This reduces the need for overbleaching, and reduces pulp degradation. HI-HEAT washing removes residual cooking chemical and dissolved wood fractions. Both factors reduce demand for expensive bleach chemicals.

LOWER LABOR COST

A continuous system requires fewer operators compared to batch processing. One operator can supervise chip feeding, cooking-washing, refining, screening, deckering, and pumping to high-density storage.

NEGLECTIBLE CORROSION LOSS

Kamyr digester shells are pressurized at all times during operation, and temperatures remain constant. This inhibits corrosion, providing indefinitely long life for the shell.

FLEXIBILITY

Kamyr systems allow new techniques not possible or economical with batch cooking. Examples: Two-Temperature Cooking** for higher yield and/or strength; countercurrent cooking for reduced consumption of cooking and bleaching chemicals; multi-stage processes for higher yields or special characteristics, and in particular, utilization of increased volumes of various types of wood residues.

INCREASE YOUR RETURN ON INVESTMENT

Even mills whose batch units are relatively new are converting to Kamyr digesters, and others are seriously investigating the same action, because of the greater return on investment provided by these Kamyr benefits. Won't you let us work with you, to analyze how Kamyr continuous cooking can reduce operating costs and improve pulp quality at your mill?

**Patent applied for

KAMR

INCORPORATED

GLENS FALLS

•NEW YORK•U.S.A.

Tel. 518 793-5111 • Telex 95612

Kamyr of Canada Ltd./Dominion Sq. Bldg./St. Catherine St. W./Montreal 2, Que.
A. H. Lundberg, Inc./7885 S.E. 30th St./Mercer Island, Washington
Lundberg-Allen Equipment Ltd./779 W. Broadway/Vancouver, B.C.

ARQUIVO TECNICO DOCE
REPRODUÇÃO AUTORIZADA