Two Roll Mill
a Revolution in Cane milling

by;

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Introduction

- Survival of Pakistani sugar industry in globalization is under stress.

1. Cost of production in developed countries is less.
   I. Per acre cane and sugar yields are comparatively high.
   II. Plant efficiencies are better.
   III. Value addition of by-products.

2. Sugar prices are volatile.
   I. Sugar price is dropped 50% comparing to 3 years back.

3. Cane price is consistently increasing year by year.

Introduction

- The way of Survival.

1. Reduction in cost of production.

   I. Per acre cane and sugar yields to be improved.

   II. Plant efficiencies to be enhanced.

   III. Value addition of by-products to be considered.

Introduction

The most potential area for improving plant efficiency is Cane Milling;

1. Consumes 30 % installation cost of plant.
2. Consumes more than 30 % power of the plant.
3. Consumes 40 % of plant maintenance budget.
4. Contributes 30 % losses of the plant.

Significance of 2 roll mill.

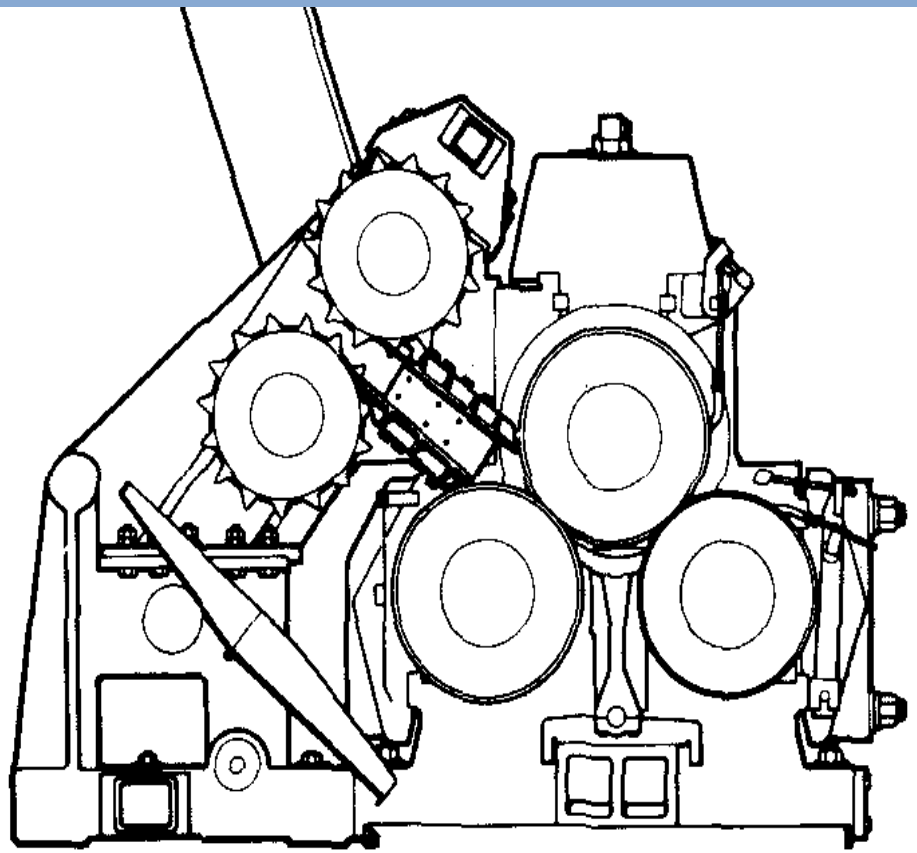
Milling Parameters.

1. Mill construction.
2. Power & Torque requirement.
3. Extraction.
4. Throughput.
5. Operational significance.
6. Maintenance.
7. Downtime.

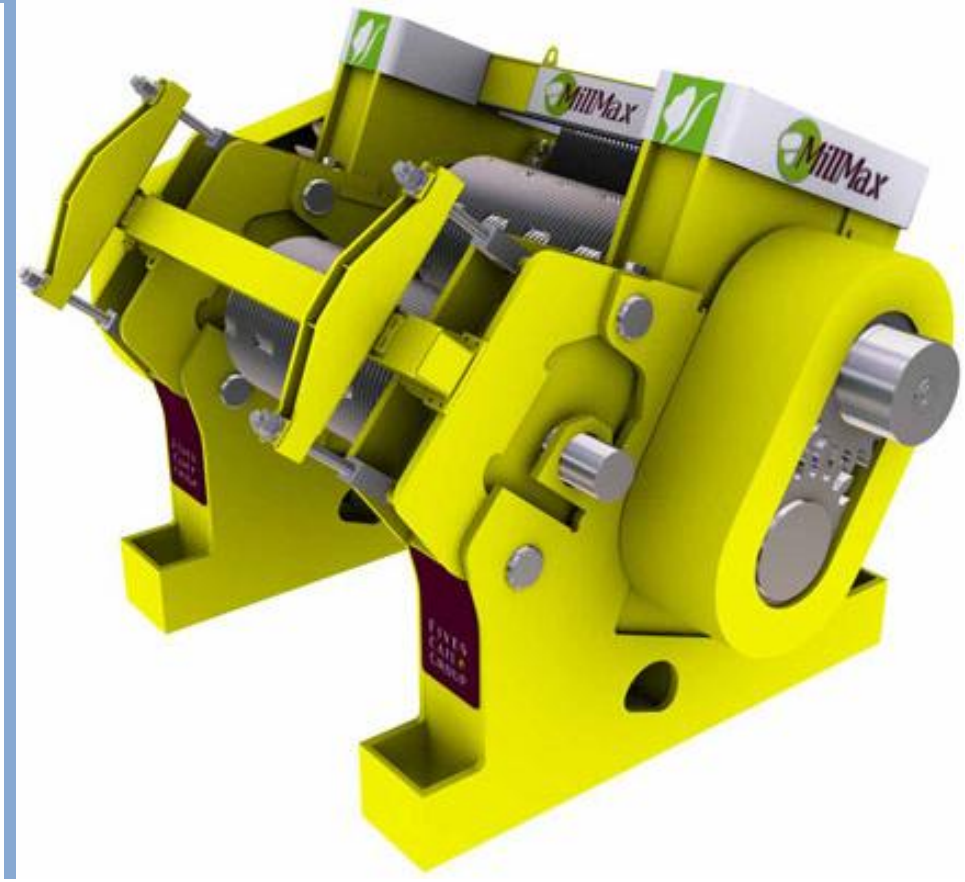
Milling Parameters.

1. Mill Construction;

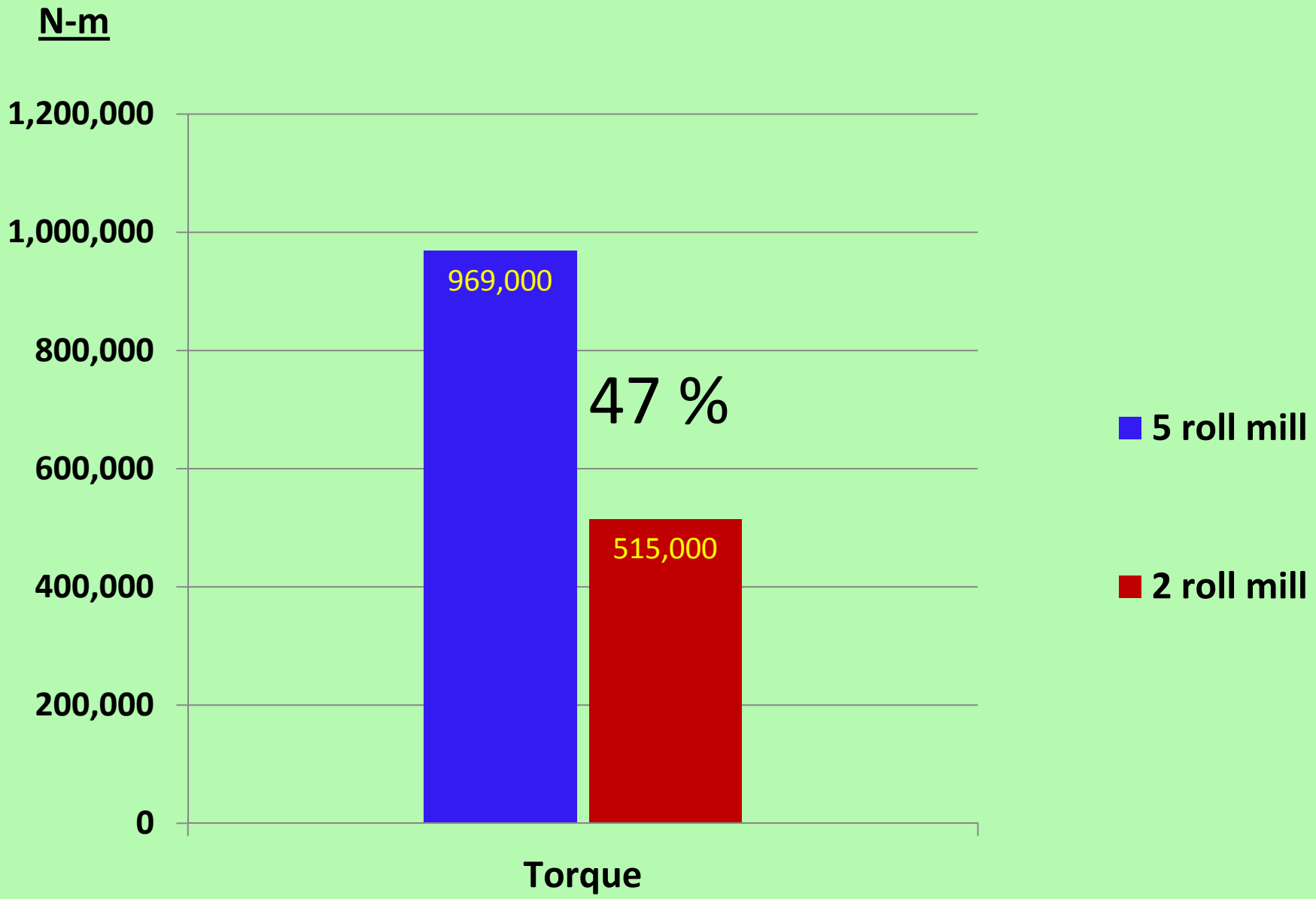
5 roll mill

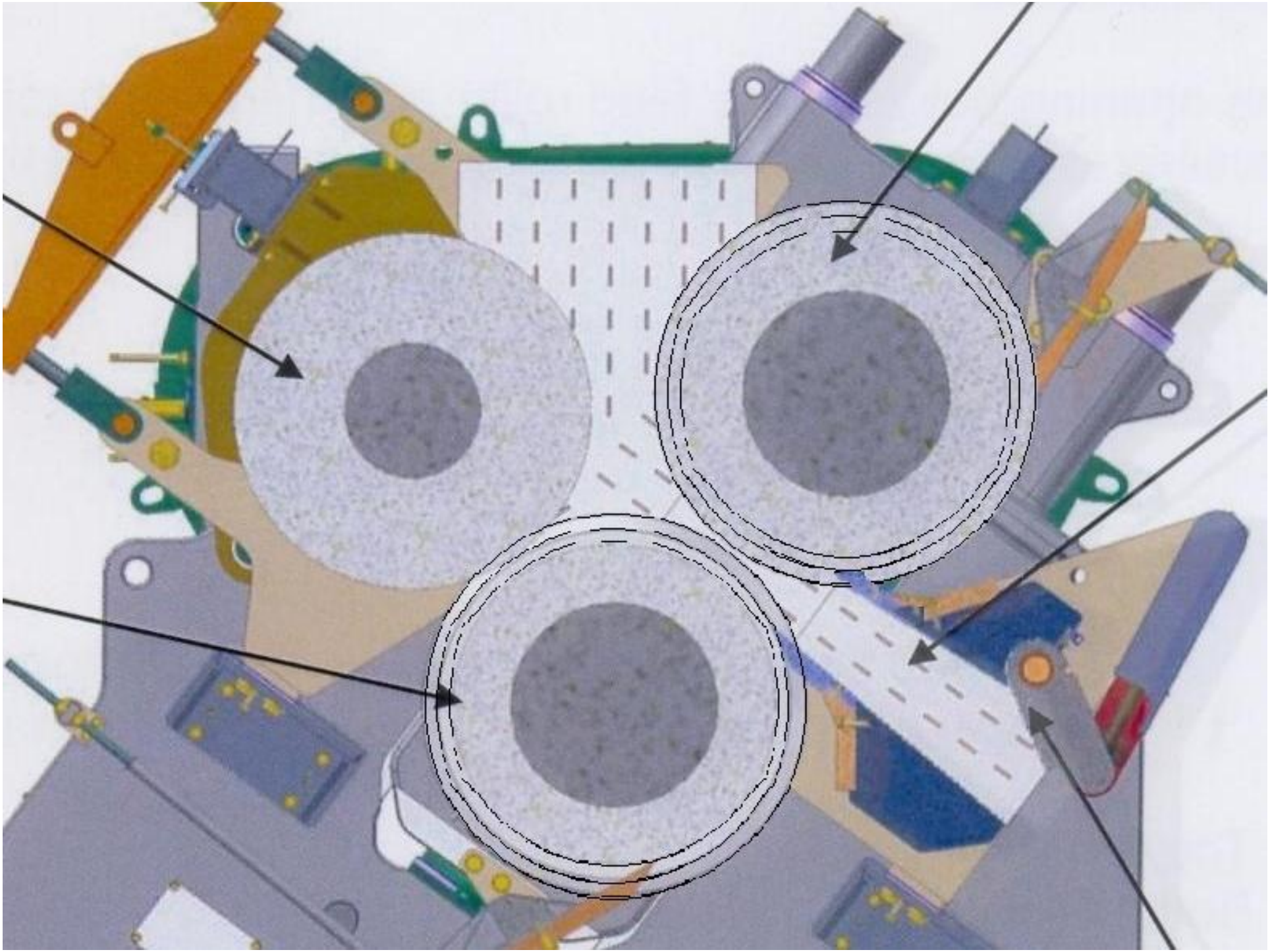


2 roll mill



Torque on Top Roll





Milling Parameters.

1. Throughput.

   I. For identical size roller, 2 roll mill has wide discharge opening comparing to 5 roll mill.

   I. It has been practically and as well as theoretically proved that extraction of 2 roll is higher with higher roll speed, if sufficient juice drainage is provided[1], hence gives more throughput then 5 roll mill with identical size rollers.

1. Adam, Clayton J. and Loughran, Jeffrey G. (2007) Finite element prediction of the performance of sugarcane rolling mills. *International Sugar Journal 109(1301):pp. 272-*

Milling Parameters.

1. Operational Significance.

   I. Fixed top roller & discharge opening;
      a) Easy and smooth operation exclusive of hydraulic system complexities.
      b) Keeps roller and bearing in parallel; increases journal & bearing life.
      c) Compression ratio remains constant thus maintains a constant pressure on bagasse.
      d) Easy mill setting.
   II. Simple and easy roll scrapping arrangement.
   III. Elimination of driving chains; reducing maintenance cost and down time.

Milling Parameters.

1. Operational Significance.

IV. Less number of pinions; reducing maintenance cost and down time.

V. Compact design;

a) Reduces juice splashing.

b) Reducing the area for microbial growth.

c) Easy inspection of mill components.

VI. Better bearing sealing arrangement;

I. Prevents the oil mixing in the extracted juice.

II. Prevents foreign material ingress in bearing.

VII. Less number of lubricant points thus reduced consumption.

VIII. Less number of bearings reduces cooling water requirement.

Milling Parameters.

1. Maintenance.

   I. Less components reduces maintenance cost.
   II. Less man hours for maintenance.
   III. In case of pinion breakage, only one pinion breaks comparing to two in conventional mills.
   IV. Less number of roll, hence less reshelling cost.
   V. Zero maintenance cost for hydraulic components.
   VI. Easy dismantle and assemble of the mill.

Milling Parameters.

1. Downtime.

    I. Downtime is comparatively less than conventional mill.