



# NEW ZEALAND AGRICULTURAL ENGINEERING INSTITUTE

LINCOLN COLLEGE

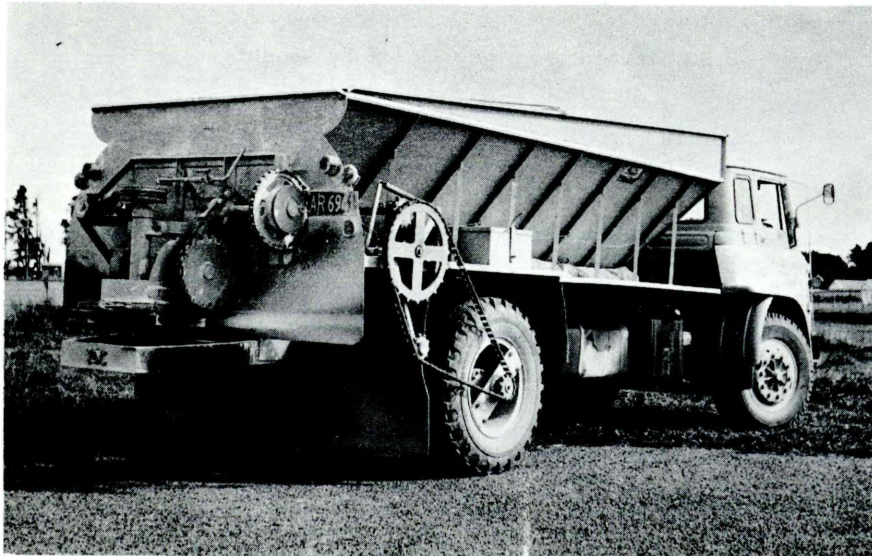
CANTERBURY, OCT 1963 NEW ZEALAND

Public TEST REPORT NO. T/39



STILL AIR LABORATORY TEST ON THE DOHERTY BULK FERTILISER  
DISTRIBUTOR SPREADING AMMONIUM SULPHATE

MANUFACTURER OF MACHINE: Doherty Bros Ltd, Grange Street, WINTON.



## TEST PROCEDURE:

A full description of the test procedure and equipment is contained in Project Report P/6 to be issued by the New Zealand Agricultural Engineering Institute. In the interim see NZAEI Project Report P/5.

BRIEF DESCRIPTION OF THE MACHINE:

The Doherty Bulk Fertiliser Distributor is a truck mounted spinning disc machine, the spinning disc being driven by auxiliary motor.

The hopper delivery system of the machine tested was of the scraper chain type, driven from the right hand rear wheel of the carrying vehicle.

The distributor is available in a range of hopper capacities built to suit the carrying vehicle. The machine tested is described as a Doherty 15 ft 6 to 7 ton chassis mounted type bin.

The spinner was designed by Topp's Patents Ltd, Wellington.

SIEVE ANALYSIS OF THE MATERIAL (Ammonium Sulphate):

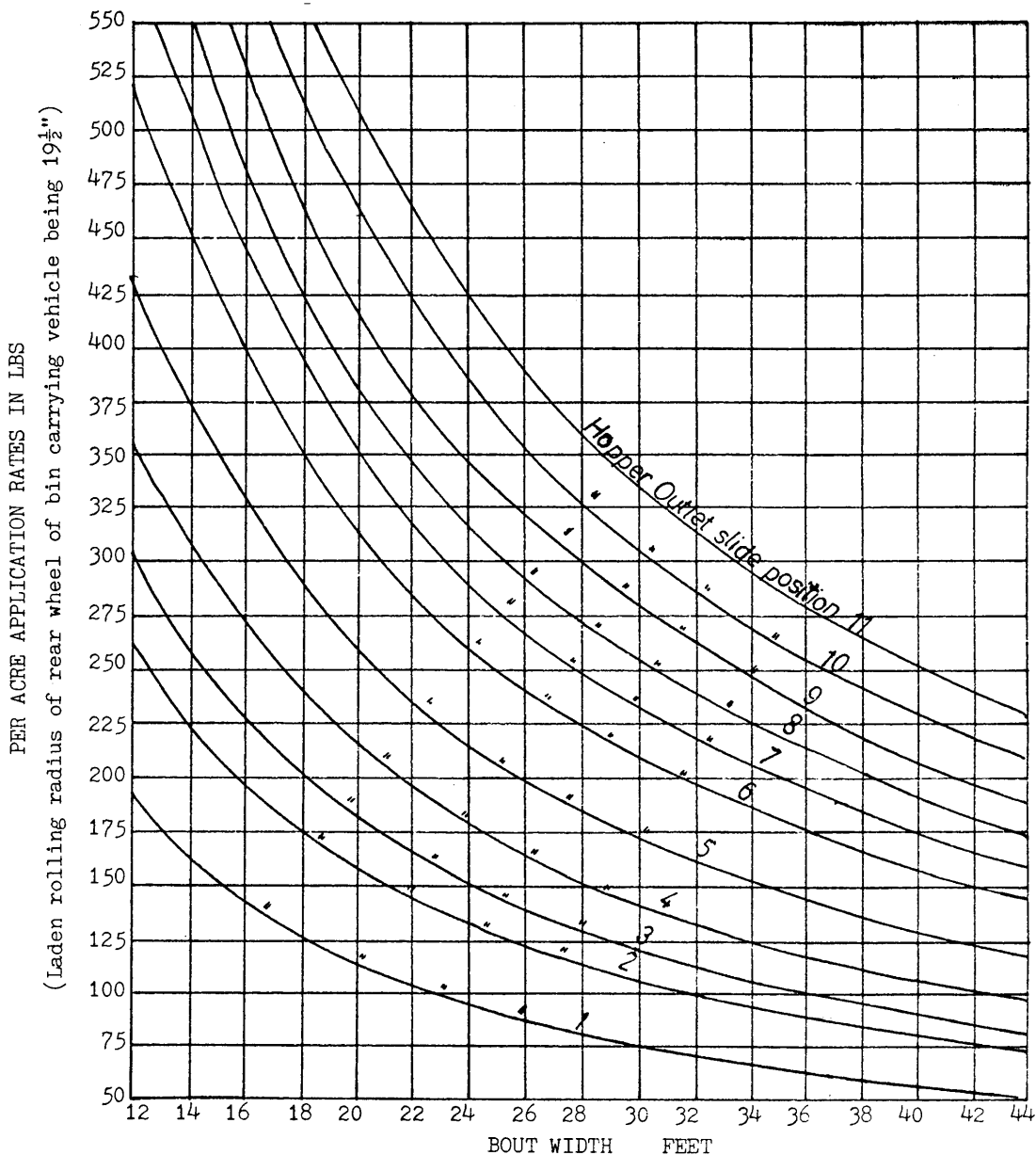
B.S. Sieve No.	% by Weight
8	10.9
12	38.8
16	35.4
22	12.5
30	1.9
Pan	0.5

BULK DENSITY OF THE MATERIAL (Ammonium Sulphate):

The Bulk Density was 65 lbs 10 oz per cubic foot.

HOPPER OUTPUT OF MACHINE TESTED AT A GROUND SPEED OF 8.1 M.P.H.

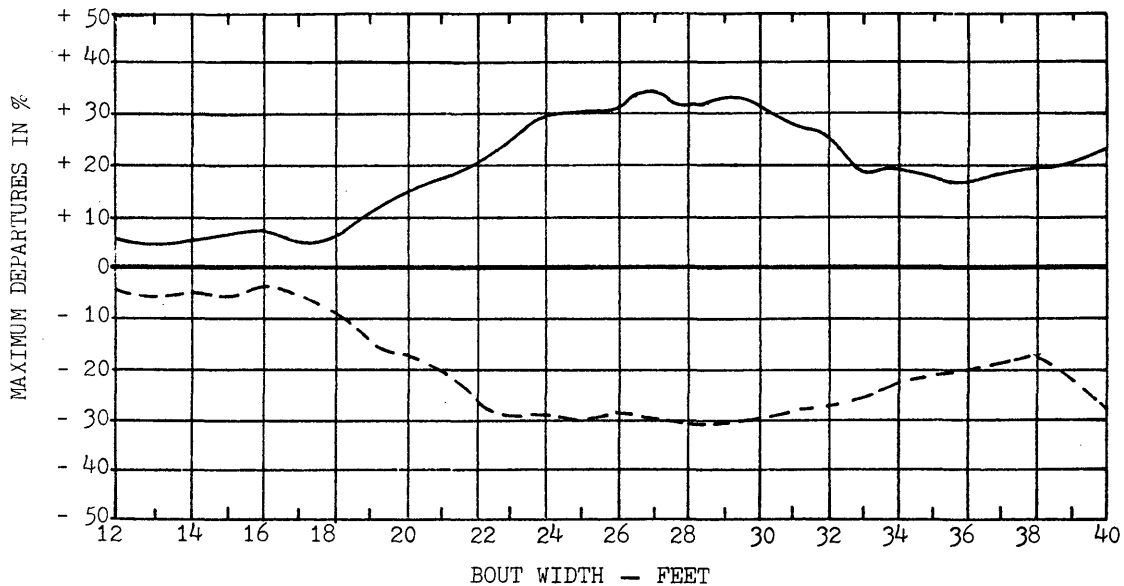
Ratio of diameters of feed chain driving sprockets  
driver to driven 1:4.



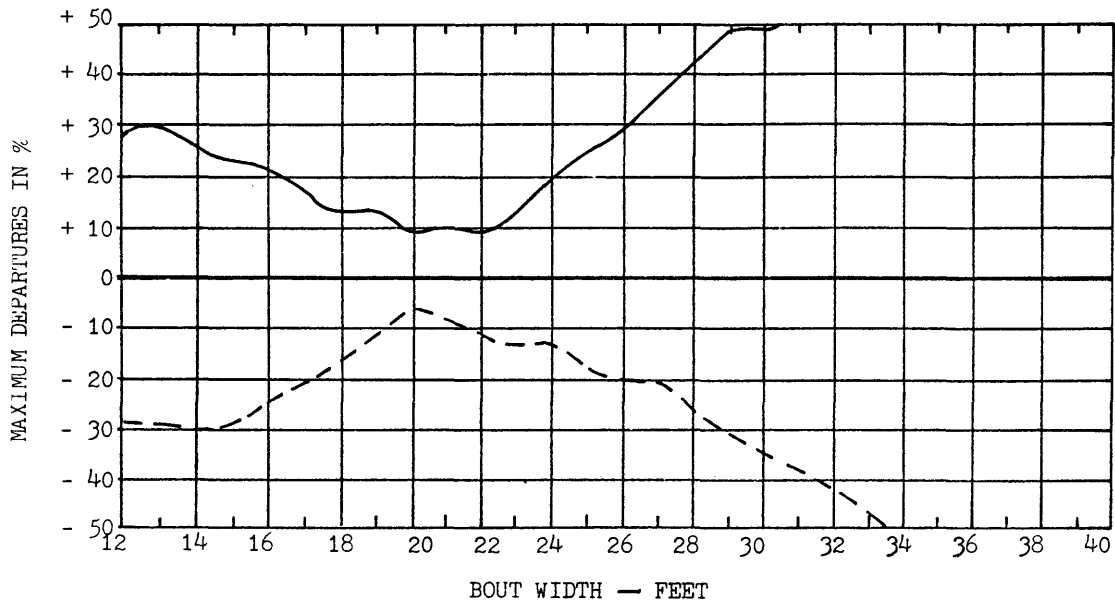
Note: Transverse Distribution measured with hopper outlet slide at position 8 only.

MAXIMUM DEPARTURES FROM THE MEAN APPLICATION RATE  
OVER A SELECTED RANGE OF BOUT WIDTHS:

Mode of Travel: Round & Round  
Above Mean Rate: —————  
Below Mean Rate: - - - - -



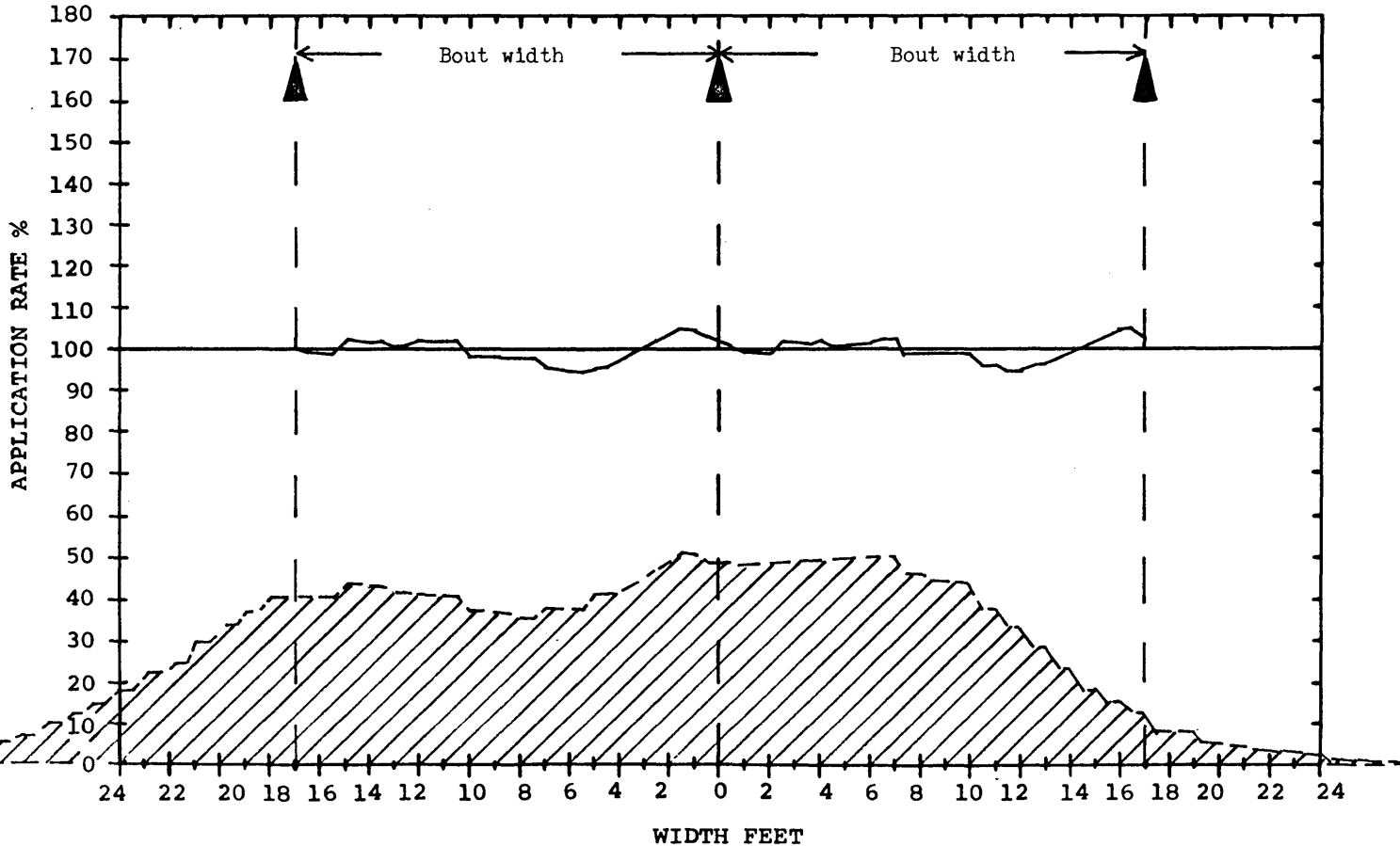
Mode of Travel: To & Fro  
Above Mean Rate: —————  
Below Mean Rate: - - - - -



# TRANSVERSE DISTRIBUTION PATTERN

Name of Machine: Doherty Bin  
 Disc Speed: 600 R.P.M.  
 Disc Setting: Adjustable outlet ring clamping  
 gear hinge boss pointing rearwards  
 Bout Width: 17 Feet

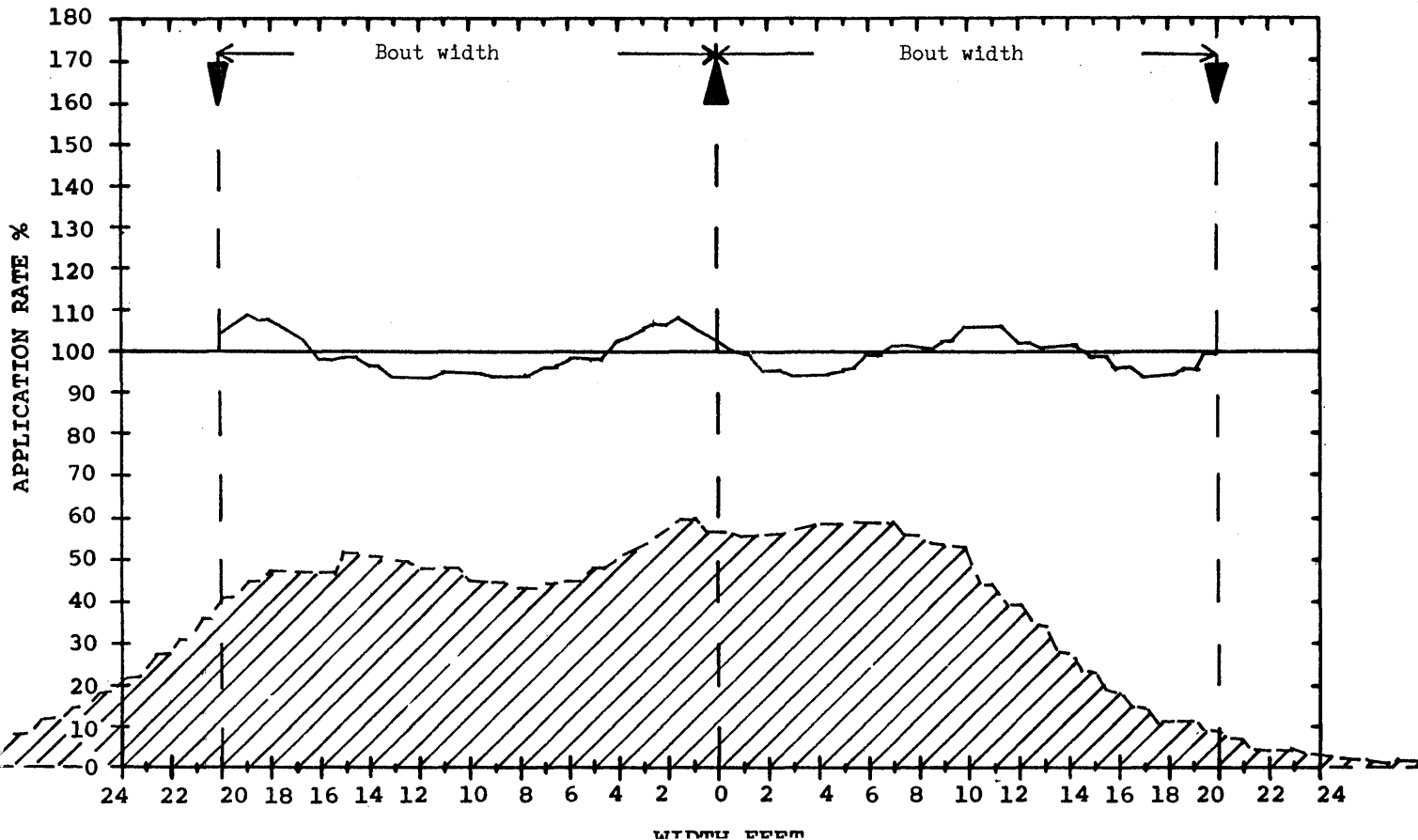
Material: Ammonium Sulphate  
 Mode of Travel: Round & Round  
 Hopper Outlet Setting: 4



### TRANSVERSE DISTRIBUTION PATTERN

Name of Machine: Doherty Bin  
 Disc Speed: 600 R.P.M.  
 Disc Setting: Adjustable outlet ring clamping  
 gear hinge boss pointing rearwards  
 Bout Width: 20 Feet

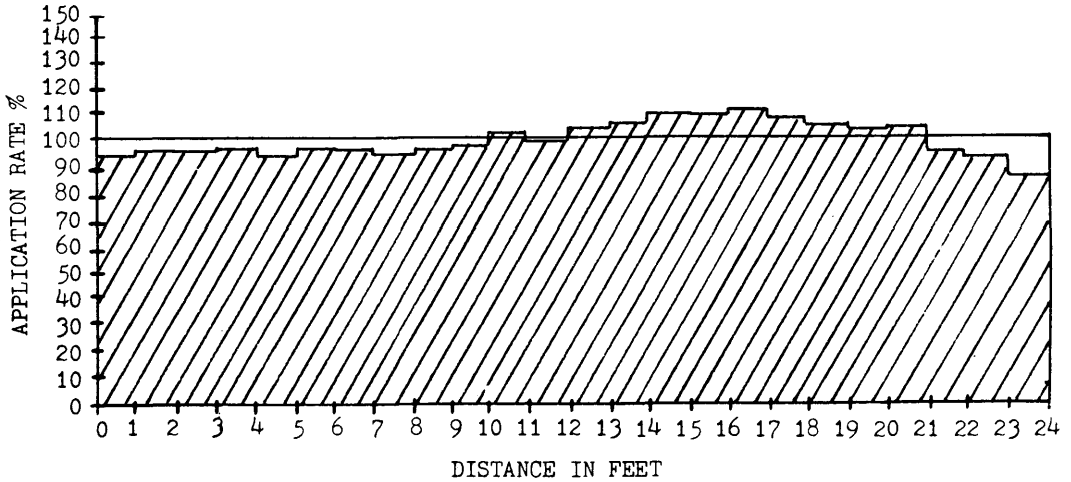
Material: Ammonium Sulphate  
 Mode of Travel: To & Fro  
 Hopper Outlet Slide Position: 4



LONGITUDINAL DISTRIBUTION

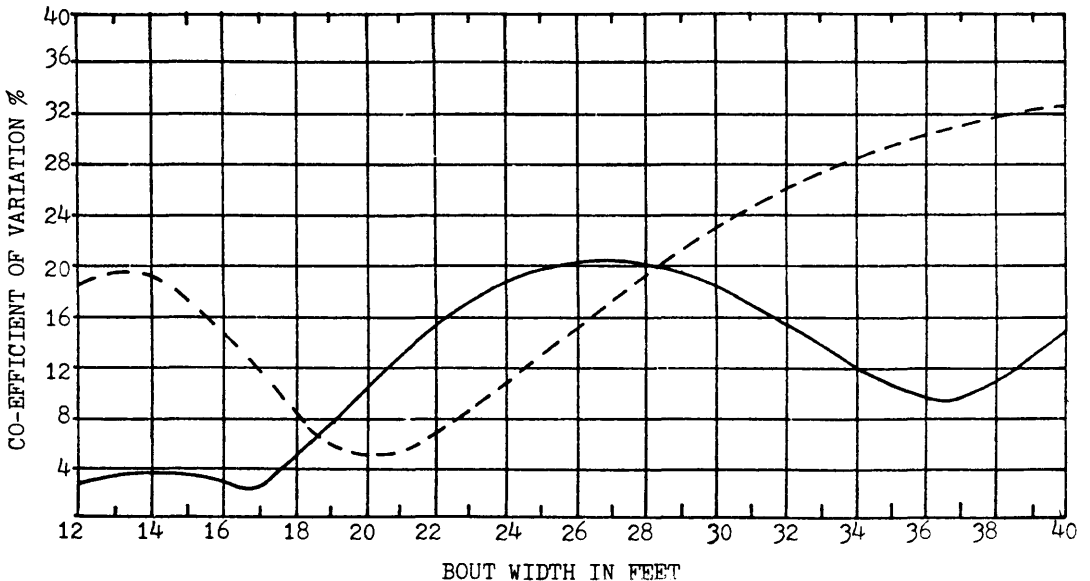
Name of Machine: Doherty Bin  
 Disc Speed: 600 R.P.M.

Material: Ammonium Sulphate  
 Hopper Outlet Setting: 4  
 Actual Test Speed:  $2\frac{1}{2}$  m.p.h.



SENSITIVITY TO FLUCTUATIONS IN BOUT WIDTH

Mode of Travel: Round & Round —————  
 To & Fro - - - - -



COMMENTS ON PERFORMANCE:

The Co-efficients of Variation at the illustrated bout widths of 17 feet for "Round & Round" and 20 feet for "To & Fro", was 2.6% and 4.4% respectively. (N.B. The lower the Co-efficient of Variation is the more even will be the distribution, perfect spreading being 0.0%. See NZAETI Project Report P/6).

The shape of the curve on the Sensitivity to Fluctuations in Bout Width graph for the Mode of Travel "To & Fro" indicates a machine/material combination sensitive to driving errors. To achieve the spreading pattern displayed on the Transverse Distribution Pattern graph for "To & Fro" maintenance of the correct bout width involving accurate driving will be essential.

The most even spreading for the Mode of Travel "Round & Round" occurred at a bout width of 17 feet, however the Sensitivity to Fluctuations in Bout Width graph curve for "Round & Round" indicates that the Co-efficient of Variation at 36 feet was 9.6%. If it was decided to operate at this increased bout width then again accurate driving will be essential.

MANUFACTURERS COMMENTS:

It appears that a co-efficient of variation under 10% can be obtained at a bout width of 36 ft for round and round mode of travel.

Testing Officer .....

Date 10-6-1970

DIRECTOR .....