DESIGN OF A LABORATORY CONICAL STRIPPER-HARVESTER FOR RICE

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ABSTRACT

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A two-row laboratory conical stripper-harvester for rice was designed and fabricated in the College of Engineering and Agro-Industrial Technology to evaluate the machine performance and hence establish the optimum combination of the operating parameters involved, namely: concave clearance C, rotor rpm N, and forward speed V, that would maximize grain collection.

The laboratory set-up consisted of five main components: the trolley, the plant feeder composed of plant guide and auger, the conical rotor which is the threshing component, the concave, and the collection pan.

Results show that maximum grain collection of 97.5%, i.e. total grain loss of no more than 2.5%, can be obtained when the rice stripper is operated at the following level of the factor variables: (1) forward speed of 1 km per hr, rotor rpm of 703, and concave clearance of 4.0 mm; (2) forward speed of 2 km per hr, rotor rpm of 752, and

concave clearance of 3.75 mm; and (3) forward speed of 3 kp per hr, rotor rpm of 736, and concave clearance of 3.40 mm.

The predicted stripping efficiency on the above values were 98.875, 98.458 and 97.802%, consecutively.

The future field prototype would have a potential capacity of 0.0432 - 0.1296 ha per hr (0.3456 - 1.0358 ha per day). It would take 8 - 24 hrs to harvest a hectare. Three men will be required to operate the stripper and will have a labor requirement of 23 - 69 man-hr per ha.

The rice stripper compared favorably with any known method of rice harvesting.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF APPENDIX TABLES

INTRODUCTION

Man is always in search for food. Different governments of the world will always strive for self-sufficiency in food to feed its increasing inhabitants. By the year 2000, it is estimated that there will be six billion people on earth, and by 2025 there will be fifty billion (Smith, 1978). If our food production lags behind, people on earth will starve. Alternative ways of increasing food production, therefore, have to be found.

In most tropical countries, rice is the main agricultural crop. It is also the lifeblood of 50 million Filipinos. The Philippines depends on 3.5 million hectares of rice farms for its rice supply.

In 1978, this area produced some 7.3 million metric tons of paddy worth 8.0 billion pesos (Palacpac, 1980). During the same period, the country was able to achieve rice self-sufficiency and exported some of the surplus. Since then, the Philippines has achieved significant gains in food production to become one of Asia's rice exporter.

This remarkable change in our rice situation can be attributed to the adoption of new technology, development of high yielding varieties, irrigation development,