

HIGHER TECHNICAL INSTITUTE

MECHANICAL ENGINEERING DEPARTMENT

DIPLOMA PROJECT

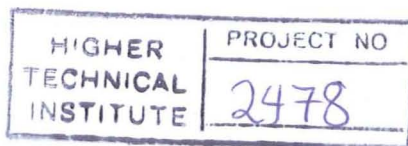
DESIGN FEATURES OF HARVESTING MACHINERY

Project Number: M/720

Student: Andreas Nicolaou (3ME1)

Supervisor: P. Tramontanellis

JUNE 1995



ABSTRACT

The aim of this project is to conduct an investigation into the design, constructional and operational features of various systems and methods used for harvesting.

Each system and method stating the above features is described with reference to drawing and diagrams. Also measures for improving the above systems and methods are suggested.

The investigation is based on existing machinery and manufacturers catalogues.

CONTENTS

	<u>PAGE</u>
ACKNOWLEDGEMENTS	
ABSTRACT	
CHAPTER 1 <u>INTRODUCTION</u>	1
CHAPTER 2 <u>POWER TAKE OFF</u>	3
CHAPTER 3 <u>MACHINERY FOR CEREALS</u>	6
3.1 <u>THE COMBINE HARVESTER</u>	6
3.1.a Flow of crop through the combine harvester.	8
3.1.1 ROTARY COMBINE HARVESTER	14
3.1.1.a Quality features from header to spreader.	15
3.1.2 MAIN DIFFERENCE BETWEEN CONVENTIONAL AND ROTARY COMBINE	18
3.1.3 KNIFE DIVIDER	19
3.1.4 IMPROVEMENTS OF A COMBINE HARVESTER	22
3.2 <u>THE BALER</u>	27
3.2.a Flow of crop through the press baler	29
3.2.1 ROUND BALER	34
3.3 <u>THE FORAGE HARVESTER</u>	35
3.3.1 Single chop machines	36
3.3.2 Double chop machines	37
3.3.3 Precision chop machines	38
3.3.4 Self-propelled forage harvester	39
3.4 <u>TYPES OF CORN (MAIZE) HEADS</u>	43

3.5	<u>LOADER WAGONS</u>	46
3.5.a	Modern loader wagons	47
3.6	<u>MOWERS</u>	51
3.6.1	ROTARY DRUM MOWERS	52
3.6.2	FLAIL MOWERS	55
3.6.2a	Types of Flail blades	57
3.6.3	DISC MOWERS	58
3.7	<u>TREATERS</u>	59
3.7.a	Method of working	60
3.8	<u>HAYMAKING</u>	62
CHAPTER 4	<u>MACHINERY FOR VEGETABLES</u>	64
4.1	<u>ELEVATOR DIGGERS</u>	64
4.2	<u>POTATO HARVESTERS</u>	66
4.3	<u>SUGAR BEET HARVESTERS</u>	69
4.4	<u>CARROT HARVESTERS</u>	74
4.4.a	Principle of operation	75
4.5	<u>TOMATO HARVESTERS</u>	76
CHAPTER 5	<u>MACHINERY FOR FRUITS</u>	78
5.1	<u>OLIVE BEATING MACHINES</u>	78
5.2	<u>PNEUMATIC MACHINES</u>	79

5.2.a	Pneumatic shears	80
5.2.b	Pneumatic olive harvesting	81
5.3	<u>TRAILED PICKER</u>	82
5.3.1	PICKER WITH VIBRATING DEVICE ON THE FRONT LOADER	83
5.3.2	TRAILED PICKER WITH VIBRATING DEVICE	85
5.4	<u>SHAKING ARMS</u>	87
CHAPTER 6	<u>SAFETY</u>	88
CHAPTER 7	<u>MAINTENANCE</u>	89
CHAPTER 8	<u>CONCLUSIONS</u>	91
REFERENCES		92
APPENDICES		