DEVELOPMENT OF A SOLID FEED BLOCK FORMING MACHINE FOR CATTLE

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DECLARATION

I declare that this is my own work and this thesis does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief, it does not contain any material previously published or written by another person except where due reference is made in the text.

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Dr. H.K.G.Punchihewa

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Abstract

Livestock statistics show that there are 1.2 million milking cows and 0.4 million buffaloes in Sri Lanka and the Department of Census and Statistics shows an annual per capita consumption of milk and milk products of about 4.6 kg/year. However, these values are comparatively low compared to the developed countries. Therefore, achievement of the self-sufficiency levels in dairy industry of Sri Lanka needs significantly both in growth and productivity. The issues which are slowing down or hampering the growth and productivity can be categorized on milk production related, distribution and marketing related, extension and support service related, consumer concern related, policy related and feeding related. Although, the nutrition is a key factor for the performance, health and welfare of dairy cattle, the prevailing cattle feeding has become an issue today for growth and production became of mostly primitive nature of practice, which is a challenge for the increased commercialization of dairy industry. Consequently, it has been identified that the well-recognized method of feeding cattle in commercial dairy industry is solid nutritious feeding blocks which are made of hygienically prepared agricultural residues.

Aim of this research were producing suitable feed block and developing block making machine for the cattle in Sri Lanka. The objectives of this research were to identifying the requirements for cattle feed blocks and their manufacturing, to examine suitable shapes and sizes for feed blocks, and to design and manufacture a feed block machine and to test the machine for verifying the results.

Suitable block forming methods, technologies and the suitable machineries were recognized through literature survey, brainstorming sessions and experimental procedures. Accordingly, design and fabrication of a novel block making machine was successfully completed. Suitable size and weight of the block, recommended recipes, production capacity of the machine, block forming method and type of power source were identified. Finally a machine was fabricated to suit the parameters identified above and was tested. Results revealed that the fabricated machine can address the design requirements of the machine. The production capacity of the machine was 100 blocks/ h with 200 mm × 200 mm ×110 mm size and 2 kg weight.

The solid cattle feed blocks can be used to fulfill the nutritional requirements of dairy cattle under safe conditions with affordable cost. Further, adoption of this technology supports to make an easy feeding mechanism and enhance milk production through available agricultural residues and available technology in Sri Lanka. Adding automatic raw material preparation system and the automatic feeding system to the compaction machine are proposed as further improvements.

Keywords: Agriculture, dairy development, cattle feed, feed blocks, feed block machine

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TABLE OF CONTENTS

DECLARATION i

ABSTRACT ii

ACKNOWLEDGEMENT iii

TABLE OF CONTENTS iv

LIST OF FIGURES viii

LIST OF TABLES xi

1 INTRODUCTION 1

1.1. Background 1

1.2. Aim & Objectives 4

1.3. Methodology 4

1.4. Chapter overview 4

2 LITERATURE REVIEW 6

2.1. Introduction 6

2.1.1. Livestock Industry in Sri Lanka 6

2.1.2. Agro-climatic zones in Sri Lanka 7

2.1.3. Dairy farming systems in Sri Lanka and available feed resources 7

2.1.4. Feeding strategies in Sri Lankan dairy industries 10

2.2. Nutritional requirement of dairy cows 11

2.2.1. Energy 11

2.2.2. Protein 12

2.2.3. Fibre 13

2.2.4. Vitamins 13

2.2.5. Minerals 15

2.2.6. Essential macro-minerals 15

2.2.7. Essential micro-minerals 15

2.3. Problem identification 17

2.3.1. Main problem 17

2.3.2. Engineer's perspective 17

2.3.3. Dependant problems 17

2.3.4. Secondary problems 18

2.4. Agricultural by-products used in feed block technology 18

2.4.1. Paddy straw 19

2.4.2. Rice milling by-products 19

2.4.3. Coconut poonac 20

2.4.4. Molasses 20

2.4.5. Mineral-rich ingredients 21

2.5. Preparation of blocks 23

2.5.1. Process flow chart 23

2.5.2. Raw material preparation 24

2.5.3. Raw material mixing 26

2.5.4. Introduction of feed-block technology 26

2.5.5. Pelletised blocks 28

2.5.6. Fodder block 30

2.5.7. Chemically hardened blocks and cubs 37

2.5.8. Low moisture (cooked) cubs 38

2.5.9. Post processing of feed blocks 38

2.6. Chapter Summary 39

3 METHODOLOGY 40

3.1. Brainstorming session conducted for finding the suitable block forming methods by using Agro-waste 40

3.1.1. Organisations/Institutes invited for the brainstorming session 40

3.2. Types of recipes 40

3.2.1. Selecting a suitable ration 41

3.3. Solution sets 43

3.4. Experimental setup 45

3.4.1. Preparation of raw materials 45

3.4.2. Pre-treatment of raw materials 46

3.4.3. Homogenising of raw materials 46

3.4.4. Forming of fodder blocks 46

3.4.5. Post processing 48

3.5. Results 49

3.5.1. From the brainstorming session 49

3.5.2. Selection of the suitable block forming method 51

3.5.3. Selection of the recipes 52

3.5.4. From the experiment 52

3.6. Discussion 65

3.6.1. For brainstorming session 65

3.6.2. Selection of suitable block forming method 65

3.6.3. Selection of the recipes 65

3.6.4. For experiment 66

3.7. Conclusion 66

3.8. Chapter summary 66

4 DESIGN,FABRICATION AND RESULTS VERIFICATION 67

4.1.1. Introduction 67

4.1.2. Details of the proposed machine 67

4.1.3. Block making process sequence 68

4.2. Designing of the hydraulic system 71

4.2.1. System design 71

4.2.2. Calculations for finding hydraulic oil flow rate 72

4.2.3. Calculation for motor power 74

4.2.4. Hydraulic circuit diagram 74

4.2.5. Calculations for production flow rate 75

4.3. Designing the electrical system 77

4.4. Designing of the compaction machine 78

4.4.1. Introduction 78

4.4.2. Size determination of the input chute 78

4.4.3. Calculations for compression ratios 79

4.4.4. Calculations for main frame 80

4.4.5. Calculations for the first-stage frame 81

4.4.6. Calculations for main cylinder fixings 81

4.4.7. Calculations for second-stage piston 82

4.4.8. Developed compaction machine 83

4.5. Result verification 84

4.6. Results from field testing 86

4.7. Discussion 87

4.8. Conclusion 88

4.9. Chapter summary 88

5 DISCUSSION 89

6 CONCLUSION & RECOMMENDATIONS 91

7 REFERENCES 92

ANNEXES 95

Annex 01: Specifications of the hydraulic system and the controlling method 95

Annex 02: Ladder diagram for PLC programming 96

List of Figures

Figure 2.1 : Mineral mixture 15

Figure 2.2 : Agriculture waste 18

Figure 2.3 : Paddy Straw 19

Figure 2.4 : Rice bran 20

Figure 2.5 : Coconut Poonac 20

Figure 2.6 : Molasses 21

Figure 2.7 : Urea 22

Figure 2.8 : Salt 23

Figure 2.9 : Process flow chart of making solid feed block 23

Figure 2.10 : Motorized Hay Cutter 24

Figure 2.11 : Different types of hay cutters 24

Figure 2.12 : After cutting the Hay 25

Figure 2.13 : Solar dryer 25

Figure 2.14 : Crushing machine 25

Figure 2.15 : Grinding machines 26

Figure 2.16 : Raw material mixer developed by NERDC 26

Figure 2.17 : Pellet making machine 29

Figure 2.18 : Pelletized animal feed 30

Figure 2.19 : Feeding fodder blocks 31

Figure 2.20 : Fodder blocks 31

Figure 2.21 : Manual block making machine 36

Figure 2.22 : Medium scale manual operated hydraulic fodder block making machine 36

Figure 2.23 : Hay block making machine 37

Figure 2.24 : Chemically harden block 38

Figure 2.25 : Sink wrapping 39

Figure 2.26 : wrap using stretch films 39

Figure 3.1 : Sample preparation 42

Figure 3.2 : Prepared samples 42

Figure 3.3 : Cut paddy straw and the cutting machine 45

Figure 3.4 : Crushing of poonac and the maize 45

Figure 3.5 : Sun drying of some raw materials 46

Figure 3.6 : Manually operated hydraulic press 46

Figure 3.7 : Block foaming using square and cylindrical molds 48

Figure 3.8 : Foamed blocks 48

Figure 3.9 : Square shape foamed blocks 48

Figure 3.10 : After doing the post processing to the blocks 49

Figure 3.11 : Licket scale 51

Figure 3.12 : Block height after one day vs applied load and sample moisture content in recipe B1 58

Figure 3.13 : Block height after one day vs Applied load levels in different block shapes and different Sample moisture levels in recipe B1 59

Figure 3.14 :Block height after one day vs Sample moisture level in different block shapes and different load levels in recipe B1 59

Figure 3.15 : Block height after one day vs applied load and sample moisture content in recipe B2 60

Figure 3.16 : Block height after one day vs Applied load levels in different block shapes and different Sample moisture levels in recipe B2 60

Figure 3.17 : Block height after one day vs Sample moisture level in different block shapes and different load levels in recipe B2 61

Figure 3.18 : Block height after one day vs applied load and sample moisture content in recipe B3 61

Figure 3.19 :Block height after one day vs Applied load levels in different block shapes and different Sample moisture levels in recipe B3 62

Figure 3.20 :Block height after one day vs Sample moisture level in different block shapes and different load levels in recipe B3 62

Figure 3.21 : Block height after one day vs applied load and sample moisture content in recipe B4 63

Figure 3.22 :Block height after one day vs Applied load levels in different block shapes and different Sample moisture levels in recipe B4 63

Figure 3.23 :Block height after one day vs Sample moisture level in different block shapes and different load levels in recipe B4 64

Figure 4.1 :3D view of the proposed machine 68

Figure 4.2: Illustrations of pressure adjusting system 69

Figure 4.3 : Raw material is loading 69

Figure 4.4 : Hopper door is closing 70

Figure 4.5 : First stage is in process 70

Figure 4.6 : Second stage in process 70

Figure 4.7 : Schematic diagram of a main hydraulic cylinder 73

Figure 4.8 : Hydraulic Circuit Diagram 75

Figure 4.9 : Schematic diagram of the hopper 78

Figure 4.10: Cross section of the main frame 80

Figure 4.11 : Cross section of the first stage frame 81

Figure 4.12 : Main cylinder fixings 82

Figure 4.13 : Front and side elevation of the second stage cylinder piston 83

Figure 4.14 : 3D view of the compaction machine 84

Figure 4.15 : The machine was in field testing 85

List of Tables

Table 2.1 : Cattle and Buffalo Systems: Topography, Climate and Animal Husbandry 8

Table 2.2 : Energy requirement of dairy cows with weight gain of 500g 12

Table 2.3 : Crude protein requirement of a cow at different stages of lactation 13

Table 2.4 : The minimum percentage of fiber needed in a cow's diet for healthy rumen function (using three different measures of fiber). 13

Table 2.5 : Recommended nutrient content of diets for dairy cattle 16

Table 2.6 : Nutritional status of Agricultural waste materials 21

Table 2.7 : Advantages of using blocked animal feeds 27

Table 3.1 : Recipes used for formulation of feed blocks at laboratory scale 42

Table 3.2 : Solution sets 43

Table 3.3 : Applied pressure to blocks during the experiment 47

Table 3.4 : Average scored values for screening the block forming method (Analytical comparisons) 51

Table 3.5 : Proximate composition & minerals of feed blocks 52

Table 3.6 : Observations for recipe B1 53

Table 3.7 : Observations for recipe B2 54

Table 3.8 : Observations for recipe B3 55

Table 3.9 : Observations for recipe B4 57

Table 4.1: Actual results of the fabricated machine including the final block size and the production 86