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AN EXPERT SYSTEM FOR PLANNING AND DESIGNING MILKING PARLOUR CONSTRUCTIONS

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ABSTRACT To plan and design milking parlours, several calculations should be made such as: the dimensions of cow platform, parlour pit, entry and exit alleys, collecting yard, and milk rooms. These items are calculated from input information such as: parlour size, layout, and design. This process requires time and effort, with the possibility of making mistakes. The objective of this paper is to develop a tool to assist the designers in planning and designing milking parlours, to save time and effort, and to provide a new design model. A mathematical model was developed to plan and design milking parlours and their concrete constructions. Subsequently, an electronic spark map (decision tree) was developed, and then the mathematical model was integrated into the electronic spark map. Afterwards, C# (C Sharp) programming language was used to develop an expert system via the electronic spark map, and to make the user interface. The developed expert system represents the main innovation of this paper, where it is able to plan and design the milking parlour, specify its dimensions, and compute the required amounts of construction materials to build the required concrete layers. Furthermore, it calculates the capital investment and the fixed, variable, and total costs. Data of 5 milking parlours were used to carry out the validation, evaluation, and calibration of the expert system. The differences between actual and calculated values were determined, and the standard deviations were calculated. The coefficients of variation range between 3% and 7%.

Keywords: Milking parlours, Plan and design, Mathematical model, Electronic spark map, Developed expert system.