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Multi-timer for milking studies

G W R Scott

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Recent research into milking machine operation has proved that the belief of old-time hand-milkers that fast milking was good milking was soundly based.

In current practice the emphasis is on convenient shed and yard design and systematic routine in handling the cows. This permits a high throughput of cows and a high output of milk per labour unit.

The multi-timer designed and built by Mr. G. W. R. Scott and described in this article will prove most valuable for pinpointing where time is lost.

MULTI-TIMER FOR MILKING STUDIES

By G. W. R. SCOTT, M.D.A., M.D.D., Senior Dairy Instructor

Most dairy farmers adopt milking and shed husbandry methods which they consider are best suited to their own conditions. However, general observations made in a number of sheds indicate that the methods are often time-wasting and contribute to mastitis and loss of production.

For some years it has been considered that shed time-studies would be useful in establishing data which could be applied by farmers to streamline their shed procedure.

In the past, attempts have been made to record some phases of milking shed operations using a watch, but the scope was limited because few recordings could be taken at one milking.
This problem led to the development of the "Multi-Timer" which can be used to record all phases of shed procedure for up to eight bails at one milking.

At this stage, definite operating plans have not been formulated. It is anticipated that the instrument will be used first to establish data in different types of sheds, and later to help individual farmers where specific problems exist under their own conditions.

The model constructed is limited to sheds connected to electricity, but as many sheds are equipped with electricity, there will be no difficulty in making initial representative studies over a wide area. However, it would be possible to construct a spring driven model if it was warranted later on.

Construction and Operation

(1) The pictures show the size and general appearance of the multi-timer, which is portable and can be operated within the protection of its carrying case.

(2) Basically, the instrument consists of a constant speed electric motor driving a friction roller feed system. This causes a six inch roll of adding machine paper to pass over a recording platform. It is then taken up at the loose end by a slip clutch pick-up spool which cannot influence the time base due to increasing diameter.

(3) The recording section is provided with eight "writing units" each consisting of a pencil lead controlled by a mechanism which terminates in a small knob and is operated manually.

(4) Recordings are made in the form of longitudinal lines and short side lines drawn perpendicular to them. The short side lines are the result of a mechanical principle which causes each recording pencil to move sideways as it is lowered onto, or leaves the paper strip.

(5) To use the multi-timer, it is necessary first to decide on the sequence of recordings required. From then on the recordings are made by lowering the appropriate pencil onto the paper when a cow enters a bail and flicking the control knob to produce a side line at the end of each sequence being observed. The pencil is raised after each cow leaves the bail.
After milking has finished, the pick up spool is removed and the markings on the paper are converted back to time units by applying a calibrated perspex slide.

The slide is calibrated at three-second intervals but readings can be estimated to one second with reasonable accuracy. At present, thought is being given to having the paper rolls printed in "graph paper" form so that readings can be made direct.

RESULTS OF PRELIMINARY TRIALS

Preliminary trials conducted at the Wokalup and Denmark Research Stations have demonstrated that the multi-timer is entirely up to expectations and will provide very valuable data for application by farmers.

The following is a summary of the results obtained at the research stations. The results for individual cows have not been reproduced in this article due to the volume of figures.

In calculating the average results quoted, no consideration has been given to the "range" of individual figures at this stage.

Wokalup Research Station—6 unit milking machine serving 6 tandem bails

The recordings were taken at an evening milking and as this was the first trial, two officers operated the multi-timer each concentrating on three bails. During the milking of 1 hr. and 20 min., 360 time recordings were made on 57 cows.

Some of the first cows in the shed were not recorded as it took a little time to settle down and establish a system.

Each of the two officers worked independently and as a result the activities recorded for the two groups of three bails did not coincide in all respects. However, some common measurements were recorded.

The following tables have been prepared to summarise the findings:

<table>
<thead>
<tr>
<th>Bails 1, 2, and 3</th>
<th>Average Time (Min. and Sec.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cow in ball before attention</td>
<td>0-9</td>
</tr>
<tr>
<td>Washing and stimulation</td>
<td>0-14</td>
</tr>
<tr>
<td>Between stimulation and teat cups on</td>
<td>0-24</td>
</tr>
<tr>
<td>Teat cups on the cow</td>
<td>5-12</td>
</tr>
<tr>
<td>Between cups off and exit from bails</td>
<td>0-6</td>
</tr>
<tr>
<td>Balls empty between cows</td>
<td>0-22</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bails 4, 5, and 6</th>
<th>Average Time (Min. and Sec.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cow in ball before attention</td>
<td>0-17</td>
</tr>
<tr>
<td>Washing and stimulation</td>
<td>0-16</td>
</tr>
<tr>
<td>Between stimulation and strip cup</td>
<td>0-6</td>
</tr>
<tr>
<td>Using strip cup</td>
<td>0-8</td>
</tr>
<tr>
<td>Between strip cup and teat cups on</td>
<td>0-13</td>
</tr>
<tr>
<td>Test cups on the cow</td>
<td>6-29</td>
</tr>
<tr>
<td>Between cups off and next cow in ball</td>
<td>0-42</td>
</tr>
</tbody>
</table>

Common Studies—All Bails

As separate studies were carried out for bails 1, 2, and 3, and 4, 5, and 6 as two groups, only the studies which were common to both groups can be included and these are:

<table>
<thead>
<tr>
<th>Average Time (Min. and Sec.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cow in ball before attention</td>
</tr>
<tr>
<td>Cups on the cow</td>
</tr>
<tr>
<td>Between cups off and next cow in ball</td>
</tr>
</tbody>
</table>

It can be observed that the times recorded for bails 4, 5, and 6 are generally greater than in bails 1, 2, and 3. This could be due to the fact that while the operator of bails 4, 5, and 6 had to attend to the yard and marshalling to the shed. Besides this, the operator of bails 1, 2, and 3 handled more young cows in the process of being trained to shed procedure.
Denmark Research Station—4 unit milking machine serving 8 standard walk through bails

The recordings were taken by one officer at an evening milking when students from the Denmark Agricultural High School were assisting with the milking.

It was pleasing to observe that apart from missing a few cows at the start, the officer was able to record the activities for all eight bails single handed.

During the milking, 274 time measurements were taken for 37 cows. These are summarised below:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Average Time (Min. and Sec.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between entering bails and start of washing</td>
<td>4-11</td>
</tr>
<tr>
<td>Washing</td>
<td>6-7</td>
</tr>
<tr>
<td>Between washing and using strip cup</td>
<td>0-3</td>
</tr>
<tr>
<td>Using strip cup</td>
<td>0-5</td>
</tr>
<tr>
<td>Between strip cup and teat cups on</td>
<td>0-10</td>
</tr>
<tr>
<td>Teat cups on the cow</td>
<td>5-30</td>
</tr>
<tr>
<td>Between cups off and exit from bail</td>
<td>0-28</td>
</tr>
<tr>
<td>Ball empty between cows</td>
<td>0-30</td>
</tr>
</tbody>
</table>

A study of the figures indicates that the shed procedure at both Research Stations is satisfactory. However, a little more time spent on washing and stimulation seems to be warranted.

Although the strip cup is used on all cows at the Wokalup Research Station, it was timed on three bails only.

It is interesting to note that the average time taken to use the strip cup on the three bails was eight seconds, while at the Denmark Research Station the average time for all bails was five seconds.

These observations indicate that using the strip cup does not take up too much time as many farmers claim.

The figures in the tables are the result of a trial to assess the efficiency of the multi-timer only. However, the figures indicate that regular checks on milking procedure at the research stations may be useful, especially following any major changes in shed staff.

Further results from the use of the multi-timer will be published in due course.

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