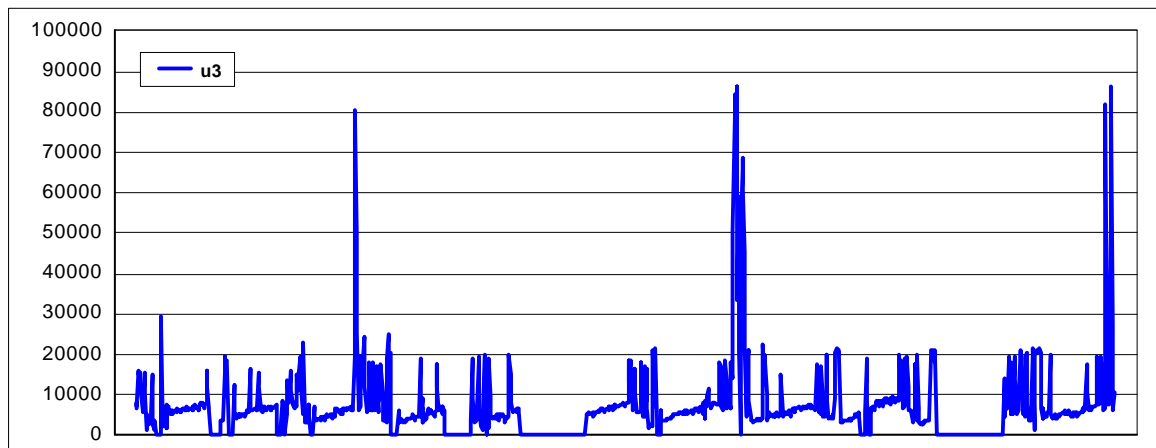
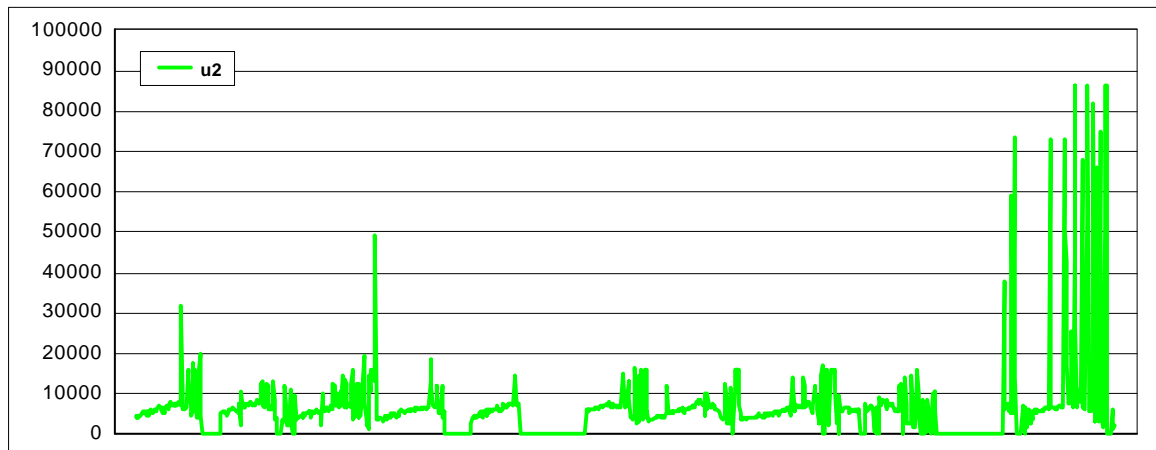
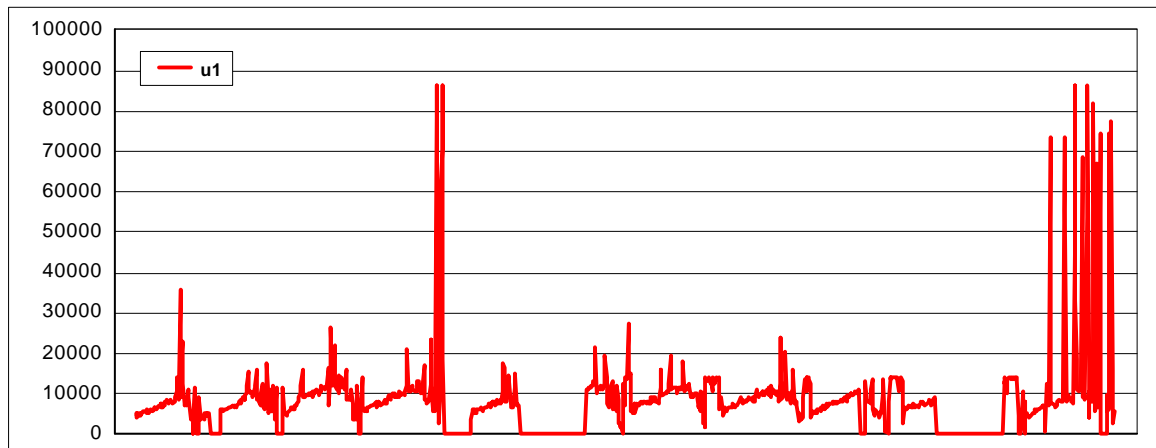
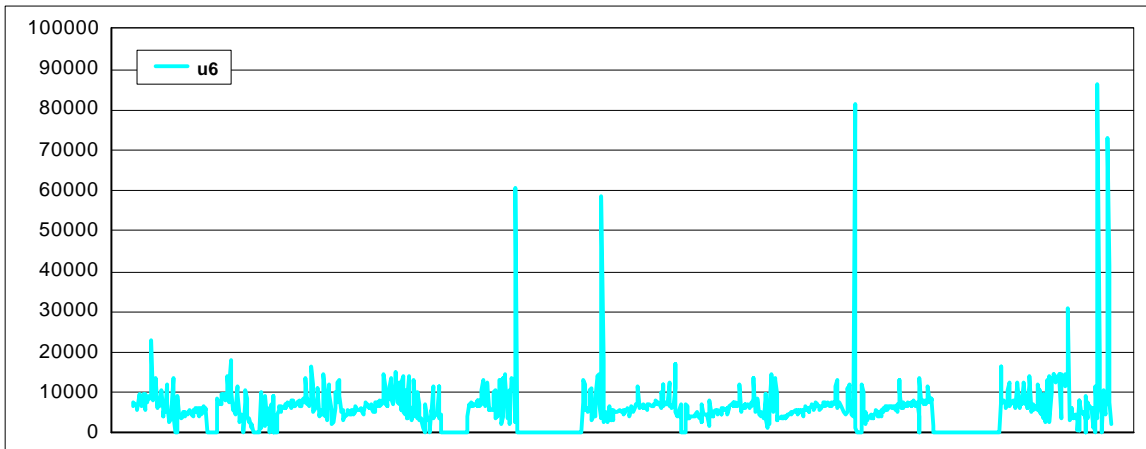
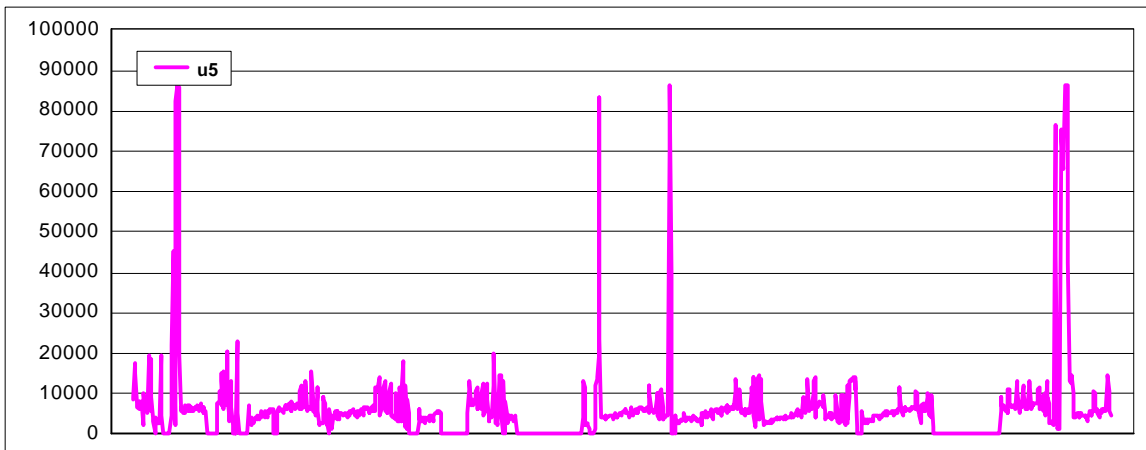
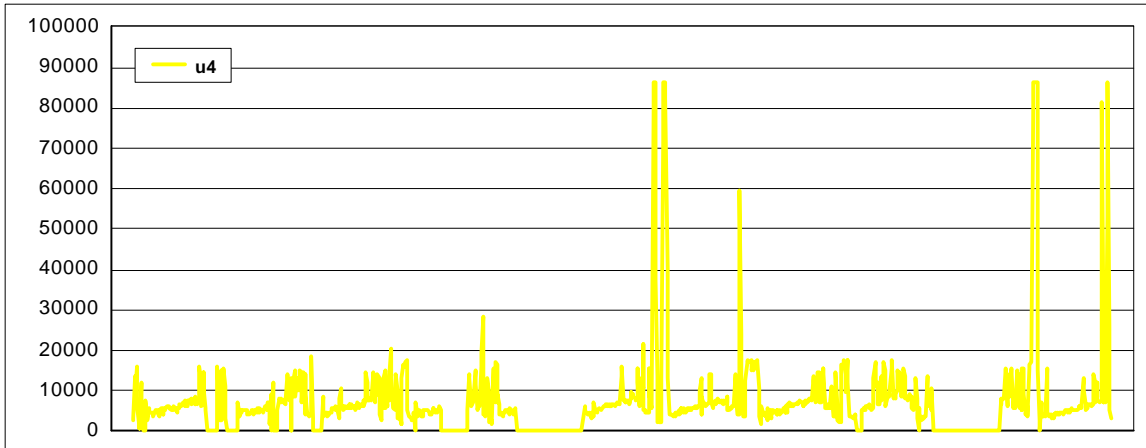
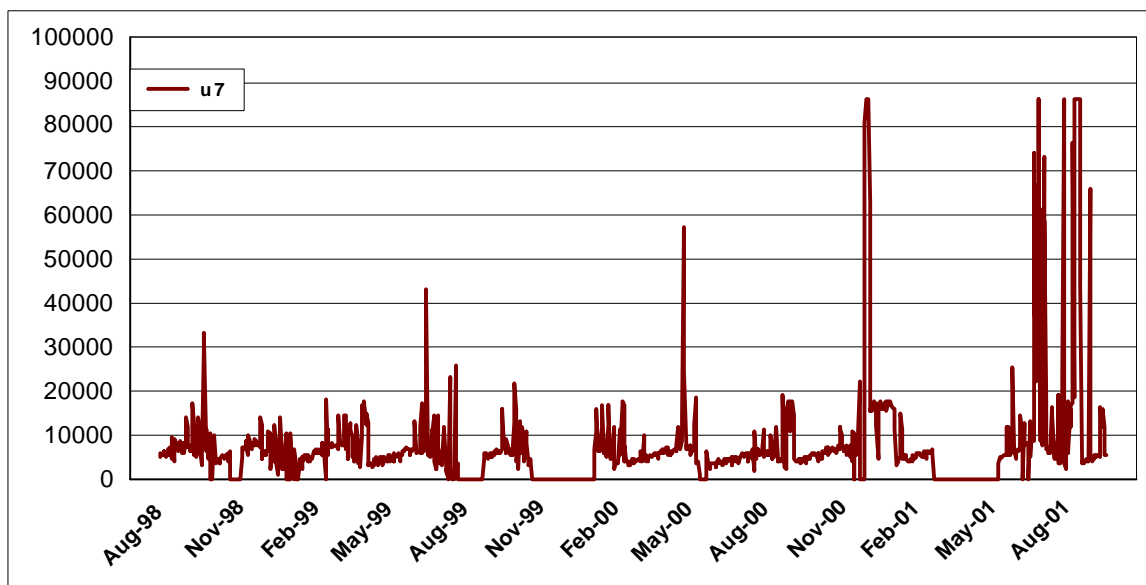


## Case Study : Excessive Auger Runs (Farm Ref : ermuk)







### **The Data**

The data is shown over a period of 1131 days (3 1/4 years). Y axis (left hand scale) shows the number of seconds of auger run per day. (For reference, 86,400 seconds is 24 hours).

The high peaks shown indicate excessive running times. For example, 86,400 means an auger ran continuously for a whole day or more of logging. Lower peaks mean a substantial part of a day, or a long run spread over two days.

There are several periods for which data is not available amounting to around 20% of the total time period.

### **Augers and Auger Control**

The auger system comprises a continuous loop auger with a 1.1kW motor (1.5 HP) from a feed bin supplying tube and plate type feeders, two per pen.

Pens run from side to side across the building, with a central lying area and scraped dunging passages either side next to the outside walls. Feeders are laid out across the building, with a feeder at either end of the pen.

Auger control consists of a timer - enabling the feed system for certain periods of the day - and a proximity sensor in the last feeder in the loop. When enabling by the timer, the auger runs whenever the proximity sensor indicates feed level is low in the last feeder. The proximity sensor has a short switching delay (about 20 seconds).

It appears that - in normal operating circumstances - the timer enables the system for about 6 hours a day. This limits the maximum run in any one day to 21,600 seconds (even if the proximity sensor is switched on - low feed level - continuously.) However, the timer can be bypassed, allowing the auger to run continuously (or at any time).

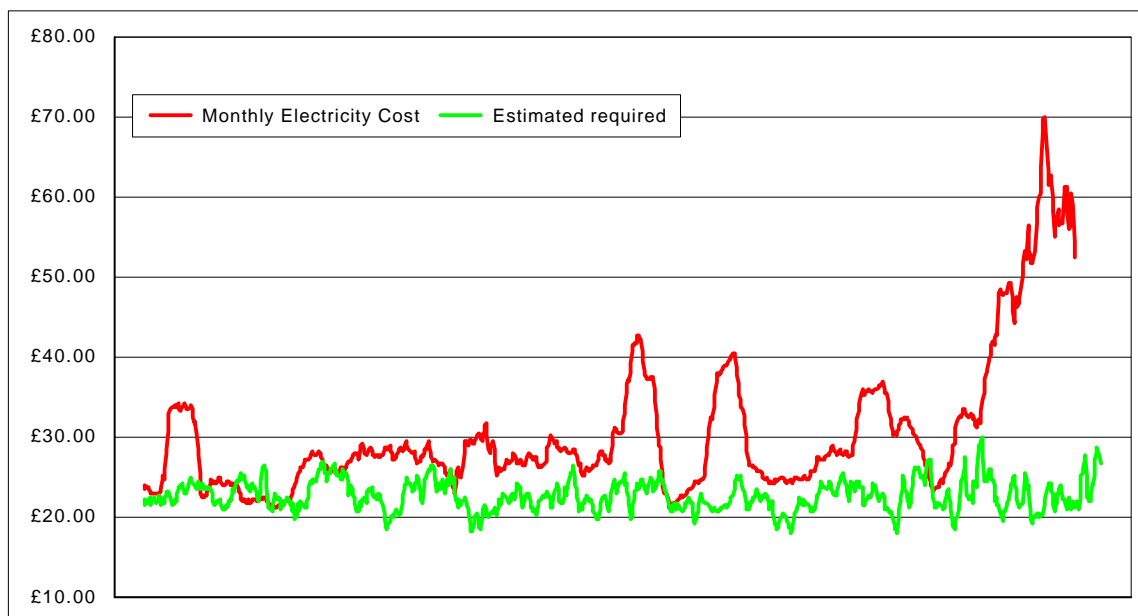
### **Additional electrical running costs**

In the following chart, the actual electrical running costs have been estimated from auger run times (at 1.1kW per motor @ 0.057p per kWhr notional electricity price). (In this chart, lost data periods have been omitted.)

This is compared to the estimated requirement by the following method :  
Excessive running times have been detected, and assumed to be not representing actual requirement. Where this occurs, the data is substituted by values from surrounding data which is assumed to represent the real requirement.

It can be seen that the electrical cost required to deliver the feed is about £22 per month. However, the actual cost has risen to around £60 per month, representing extra costs to the producer of £38 per month.

Using a notional estimate of 670 pigs produced per month (based on the number per room and the apparent batch production time) this amounts to an extra 1kWhr per pig produced, or 5.7 pence.



Note : Estimates based 1.1kW motor rating. Actual electricity usage may be marginally less than this.

### ***Cause of the problem***

Excessive auger running (Over runs) may be due to empty or bridged bins, or faults associated with the proximity switch (failing to indicate the system is full).

Either or both may have occurred at various times in the installation.

To what extent the feed control installation (such as proximity switch) has become less reliable in itself is not clear.

As well as many occasions when augers have run for an excessive length of time, there have been many on which the auger has not run at all for significant periods of time, when clearly it needed to have done so (Under Runs) - probably caused either by an auger trip out, or a faulty proximity switch.

It is, however, possible that Under Runs are caused by a blocked feeder down pipe, or even pigs choosing not to eat from the feeder. (In other situations with feeders at either end of a pen, it has been found that pigs may choose to eat only at one end or the other.)

In recent months, it appears that timers have been bypassed to a greater degree than previously, meaning an increasing number of occasions on which augers run for 24 hours in a day, whilst previously being limited to a maximum of 6 hours.

Whilst this now makes triggering problems more apparent, it can be seen from the above chart that such incidents have plagued the installation from relatively early in the overall period of logging.

The control system has feed and water meters with integral alarms but, for whatever reason, the user has preferred not to use this facility.

## Impact on Production Costs

Ranked in increasing order of importance -

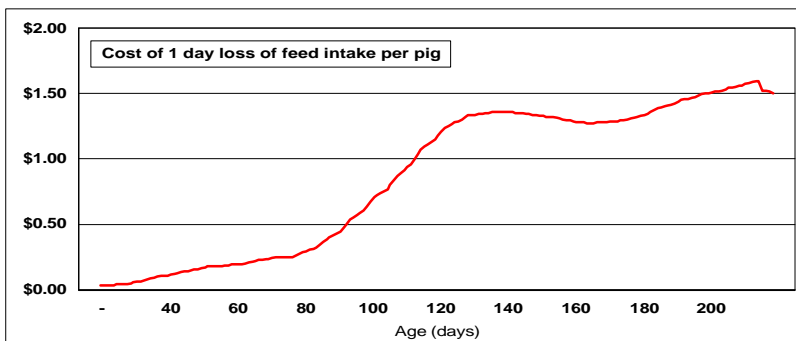
The electrical cost aspect - whilst having become more significant - is probably the least concern in this situation. (It is, however, of direct relevance with respect to Climate Change Levy. The producer is required to make efforts to reduce electrical consumption. Since auger electricity use is increasing, this must either be corrected, or greater reductions must be made elsewhere.)

Next comes equipment wear and service life. Some augers are now operating 2 to 3 times their "normal" (required) operating times. This might be reasonably expected to incur greater wear and correspondingly to reduce service life to the same degree.

Of overriding potential importance, however, is impact on pig feed intake and therefore growth. This is covered at greater length in other documents, but a couple of basic points here -

When auger logging displays abnormal characteristics, it is not possible directly to determine from auger records alone whether or not feed is present or absent, and whether intake may have been affected. For example, if an auger runs for several days, there may or not have been feed present in the hoppers, depending on whether it was a fault with the proximity switch, or the bin being bridged.

However, by checking associated water intake, a reasonable guess can be made. That is, if auger operation is abnormal - either very high or very low - and water intake is low, it is



reasonable to assume that feed intake has been reduced. This has occurred in this installation on many occasions.

For pigs later in the production cycle, cost of loss of feed is estimated at about £1 per day per pig. Generalised cost

estimates - from US data - is shown in a following chart.

If and when this occurred in this installation, it would amount to over £500 per day for one room.

This is clearly of much greater financial impact than electricity cost increases. However, unlike electricity costs, such higher operating costs would not be readily identifiable to the producer (being merely worsened FCR).

## Summary and Conclusions

There are many occasions in this installation when augers operate for an excessive amount of time.

The situation appears to have worsened significantly in recent months, though to what extent it is due to equipment reliability worsening, an increase in timer bypass, or other issues such as feed composition, is not clear.

Logging indicates a significant number of occasions on which feed intake is judged to have been deleteriously affected.

As well as increased electrical operating costs, higher equipment wear and loss of production efficiency are likely to have occurred.