Hönnun X - Rintintin

Electrical Group
Power estimation

3. febrúar 2011

Power estimation for the motors in Rintintin

Three 12V 25Ah Lead acid batteries were discharged last tuesday (1.februar). The discharge current was 2A over 12V for 12 hours.
So to estimate the energy in each battery the following calculations were made:

For a single battery/ one cell:
Current: 2A
Voltage: 12V
Time: 12hours $\rightarrow$ 43200 seconds $\approx$ 43000s

So the energy dissapated is:

$$E = P \cdot t \Leftrightarrow E = I \cdot V \cdot t$$

$$E = 24W \cdot 43000s = 103200J \approx 1MJ$$

But those batteries are only 12V and our motors require 24V so we need to connect two batteries in series. And we have the following:
Voltage: 24V
Current: 2A
Time: 12hours

$$E = 48W \cdot 12h \cdot 3600s = 2073600 \approx 2MJ$$

We have two motors that are rated 120W each so the total power we need is 240W (Full load). By dividing the energy with the power we can find the time that the batteries can supply power to the motors

$$t = \frac{E}{P}$$

$$t = \frac{2000000J}{240W} = 8333s \approx 8300s$$

$$t = 8300s \rightarrow 2hours18minutes$$

This estimation is **only** for the energy requierd by the motors at full load using only two batteries/cells.