

## SUMMARY

The problem this report is concerned with is to find the maximum horsepower that man can generate with a standard bicycle transmission.

} *objective*

### Results of Investigation

Ten volunteers pedaled a Sturmey-Archer bicycle transmission. The results show that pacing efforts, individual training, and simultaneous hand-cranking and cycling all increase the horsepower that can be generated. Utilizing these methods together can give a maximum of 1.5 horsepower for take-off procedures and 0.5 horsepower for cruising speed.

} *summary of results*

### Conclusions and Recommendations

*results and conclusions*

1. There is a steady oxidative energy production of 0.5 horsepower falling to 0.475 horsepower after 25 minutes as a result of long term fatigue. Therefore this horsepower must be sufficient to maintain a cruising speed for the MPA. #1
2. Simultaneous cycling and hand-cranking procedures yield 50 per cent more power than cycling alone, but can be maintained for only short periods of time. The maximum horsepower available utilizing this procedure is 1.5 and can be maintained for less than fifteen seconds without substantial fatigue. Therefore this horsepower must be sufficient for an MPA to overcome drag and gain enough lift for a take-off. #2
3. The effects of breathing pure oxygen during prolonged periods of strenuous cycling were found to be extremely dangerous. Therefore this technique does not suffice as a possible method for maximizing power output. #3
4. Training the individuals to pace themselves increased their power output 20 to 30 per cent due to the increased efficiency of maintaining a desired speed on the bicycle ergometer. Therefore it is not necessary to obtain a professional cyclist for needs since an amateur can be trained to generate a greater output. #4

On the basis of these findings I recommend that the cyclist/pilot controlling the MPA hyperventilate prior to take-off. This is to maximize his oxygen debt and provide the most oxygen available to his lungs and muscles. Also the cyclist should pedal at the optimum speed of 60 revolutions per minute. This rate can and should be increased to 120 RPM so that efficiency is sacrificed for work output to gain lift for a take-off. Finally, the cyclist should be trained to pace himself to prevent confusion and maximize his transfer of muscle power to mechanical work.

} *recommendation*