An evaluation of the effect of machinery overlaps on draught forces and fuel consumption in tillage operations

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1 About me

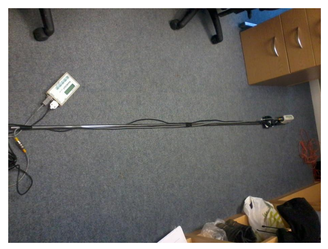
- I am a PhD student of full-time doctoral study programme in Technology and mechanization of agricultural production at Department of Machines and Production Systems, Faculty of Engineering at Slovak University of Agriculture in Nitra. Title of my PhD thesis is 'Controlled movement of machines at field and its effect on efficiency of the production process'. I am in my 4th year ,which is my final year.
- My supervisor is: prof. Ing. Vladimír Rataj, PhD.

2 Erasmus Practical Placement

- I undertook a exchange research programme from 1st February till 1st June 2013 at Harper Adams University.
- First supervisor: Dr Paula Misiewicz MSc MEng PhD AMIAgrE
- Second supervisor: David White CEng, CEnv, FIAgrE, MIMechE
- In my research project I was looking at the effect of machinery overlaps on draught forces and fuel consumption in tillage operation.

3 Activities conducted at Harper Adams University

- Planning and conducting experimental research.
- Conducting a comprehensive literature review and producing a scientific article.
- Working with a Trimble guidance system, Crop Circle Sensor for measuring NDVI, Neutron probes for measuring soil moisture, EDT (Electronic Data Transfer), Caterpillar 177-8910 Power Link Group (Dynamometer).
- Supporting a number of other research students.
- Laboratory Induction: Princess Margaret Science Laboratories
- Health & Safety Training: Engineering Department
- Attended a series of research seminars at Harper Adams University and other UK institutions.

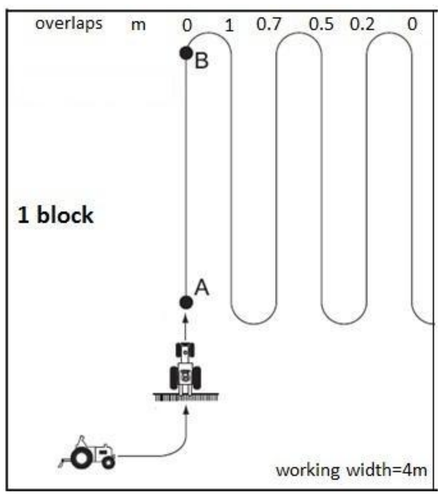


4 Research Project at Harper Adams University

Scientific paper

Title: An evaluation of the effect of machinery overlaps on draught forces and fuel consumption in tillage operation

Insufficient use of machine working width has the effect on decreasing of machine work efficiency. Negative after-effects could be as follows: soil compaction caused by heavier machinery, over or under application of fertilizers and chemicals, increased fuel consumption, increase in working time, etc. Availability of satellite guidance systems, which allow greater accuracy and controlled movement of machines, give a possibility to reduce the economic costs of production and increase the environmental sustainability. The main advantage of using a navigation guidance system is a reduction in application errors. Overlaps and skips cause negative after-effects on individual machine operations. This research focused on the effect of machinery overlaps on draught force and fuel consumption during tillage operation.



5 Experiences at Harper Adams University

- I have learnt how to design and conduct field experiments in different research areas (help other researchers).
- I have gained new knowledge on Controlled Traffic Farming.
- I have learned about British culture (manners, food, etc.) and I have seen some parts of the UK.
- I have learned about the university system in UK.
- I met a lot of international students and I was a part of very nice group of these students.

6 Recommendation

- I recommend Harper Adams University to everyone. It was a great experience for me.