Machinery Standards for CTF – Pipe Dream or Logical Necessity

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Abstract: The introduction of CTF standards across the Australian grain industry would promote adoption; lessen the degradation of our productive soils and lower machinery capital costs to manufacturers and growers. With standards for wheel track and operating width most farm sizes and systems can be catered for and resale value is assured.

The current proliferation of operating widths and wheel spacings is wasteful of both natural and financial resources. Manufacturers are unable to tool up with any degree of confidence, prices are higher, and every machine is a special build. Yields are reduced; costs are increased and competitive advantage lost.

A simple set of standards are proposed, their applicability across a range of industries discussed and a framework to progress outlined.

Keywords: CTF, standards, 3m,9m,12m, harvester, system

INTRODUCTION

Standards are an everyday part of mechanised agriculture. Every time a farmer attaches a PTO shaft, or picks up a 3pl. implement, they are depending on the manufacturer building that equipment to the relevant standard. In the absence of standards there is chaos, as the current mushrooming of black boxes in tractor cabs testifies.

The call for an Australian CTF standard is not new, Peter Walsh and Troy Jensen first outlined the case for standards at CTF 98, Jeff Tullberg, Peter Walsh and the author recommended the adoption of standards in the KDI00004 project report to GRDC in 2003. Our consultancy has been advising growers of those informal standards since then.

DISCUSSION

Wheeltrack standard

Chapman (1998) identified three common wheeltrack spacings, based on the spraying equipment used at the time of moving to controlled traffic.

- 1.5-1.8m - spraying with utility or tractor,
- 2m - tractor or truck and
- 3m with modified tractor or SP sprayer)

The narrower systems were unable to accommodate the grain harvesting operation, although some hay production systems are working successfully on 2m. Only 3 meters enables graingrowers to progress their system to include all heavy wheels operating in the paddocks. All current model harvesters can be optioned to a 3m setting and narrower tyres of sufficient capacity are available.

In the high rainfall zone, dual systems utilising beds, have developed which involve 2m centres for the tractor and 4m centres for harvest and sometimes spraying. As can be seen from Table 1 these

systems are at best a compromise, resulting in a larger proportion of crop suffering wheel induced compaction. Configuring raised beds to suit a 3m system would provide benefits in terms of limiting wheel traffic, reducing capital costs by alleviating the need for both bed and flat equipment and drainage capacity could be improved by installing minor furrows at 1.5m intervals in the wetter areas.

Table 1 Common systems - %wheeled

System	% wheeled
2m centres 15m planter, Auto steer, 30m sprayer, random harvest 11m	29%
2m centres 8m planter, Auto steer, 24m sprayer, 10m harvest 3m centres harvester on 800mm tyres	22%
As above but all 500mm tyres and harvester on 4m centres	16%
9m CTF	12%
12m CTF	11%
2m CTF cane 800mm twin rows	50%
3m CTF cane 1.5m rows	33%
Horticulture 2m CTF	25%

Operating width standard

This standard is best described by the narrowest practical width operating in the system.
It should:

- match the width of the harvester fronts available
- it should be a multiple of the wheeltrack width
- suit the majority of situations across Australia
- be simple and concise

This paper suggests that 9m and 12m fulfil all the above conditions. These systems offer the lowest % of wheeled soil, the widest range of planting and spraying capacity and the easiest harvesting solutions.

Choosing which standard width is best suited to an individual's farming system should be based on a comprehensive review. CTF Solutions take clients through a process, which looks at but is not limited to:

Farm size
Timeliness of all operations
Labour
Budget
Goals

Application of standards

While standards may not appeal to the rugged individualism of Australian farmers and manufacturers, it should be stressed that the absence of clear guidelines is costing the industry millions of dollars every year. Production costs are increased by higher tooling costs and inventories needed to offer a range of sizes to tempt the buyer. We are seeing evidence of this as companies decrease their product range in an effort to survive.
It does not "lock" a grower to that standard, a manufacturer will still build what the grower wants, but they will charge more for a "non-standard" machine and justifiably so. The smaller grower is not excluded by the adoption of standards. The key objective is to bring all facets of harvesting a crop into the system; currently this is easier at sizes under 9m.

It should be noted that it is not harvesting per se which is difficult to achieve under a CTF system but rather the unloading of the harvester *on the go*, which requires the most effort. This requires the transfer of grain from the harvester bin to a chaser bin running on the adjacent set of wheeltracks. Some machines, at either 9m or 12m, require modification to both unloading auger and chaser bin. Table 2 provides details of some models and the extent of modifications required.

Table 2. Harvesters, 3m compatibility, auger length and distance to adjacent track

Make	Model	Auger length Std. (m.)	Gap to 9m centre (m.)	Gap to 12m centre (m.)	3m centres
CaseIH	1688	5.28	2.64	5.7	Yes
	2188	5.28	2.8	5.86	Yes
John Deere	9610	6.1	1.8	4.86	No

Impact of standards

Can two module widths satisfy the differing conditions, variation in climate and crops occurring across Australia? Successful farming systems based on these widths already exist in all states. Planter sizes from 9 to 24 metres are possible as multiples of either 9 or 12 metres. Sprayers up to 36 metres are in use in the WA grain belt. 12 metre fronts allow modern Class 7 and 8 harvesters to be operated efficiently in lower yielding crops.

Timeliness of operations is an integral part of the CTF system and growers should consider all facets of the system before deciding on operating width. Managing systems is not a new exercise for growers but many issues need to be considered.

Depending on speed, planting widths from 9m to 24m can give a range of 48 to 200 ha per 12 hour shift. Spraying capacity is a function of the spraying window and the area to be covered, northern farms may be expected to have more spray capacity due to less favourable climatic conditions during the fallow period.

Chaser bins, drying, windrowing or simply bringing additional harvesters in for the large crops, can increase harvest capacity. Some clients have been able to reduce capital expenditure on harvesters. The choice of front size can impact harvester capacity in light crops. (Table 3)

Table 3 Theoretical Harvester capacities based on 100% field efficiency

Width	T/hr [1]	T/hr [2]	T/hr [3]
9	37	27	15
12	50	36	20

[1] Wheat - 6t/ha and 7km/hr
[2] Wheat - 3t/ha and 10km/hr
[3] Wheat - 1.2t/ha and 14km/hr

APPLICATION TO OTHER INDUSTRIES

It is unlikely all the standards proposed above will provide solutions for diverse industries such as sugar and horticulture. What is suggested is a process providing a blueprint for those industries to move forward.

Irrigated crops

Row spacing configurations driven by machinery and tyre selection appear to characterise flood irrigated agriculture. New technology adopted for water use efficiency gains may allow many irrigated crops to move to compatible row spacings with the standards outlined above.

Sugar

As can be seen in Table 1 cane on 2m CTF still suffers 50% wheelings. Unfortunately, like the grains industry in the 90's, the industry is constrained by a lack of compatible machinery. Three metre CTF may well be the ideal solution however there is no harvesting equipment available and little industry support or enthusiasm for such a radical change.

Horticulture

Combined with guidance CTF offers tremendous advantages to many horticultural producers. Controlled traffic alone has been shown to increase yields in a range of horticultural crops by 10%. (Gan-Mor & Clark, (2001) quoting Hadas, (1987) This translates to significantly higher profits per hectare, which could be used to fund RTK guidance delivering further savings in production costs.

CONCLUSION

Walsh (1998) quoting the ASAE (1983) states, "Standards are developed and adopted because of a need for action on a common problem." Australia's broadacre grain systems can benefit from the introduction of a simple set of standards. Stakeholders should lobby funding bodies and industry groups to pursue the implementation of Australian standards for controlled traffic farming machinery as outlined above. Other agricultural industries can benefit considerably from the introduction of controlled traffic and have an opportunity to promote adoption by addressing the issue of commonality early in the process.

REFERENCES

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