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One Design to Fit Them All

How changing to a parametric design will increase the number of blueprints available for DIY ROPS

Rollover Protective Structures or ROPS are a simple way to improve safety on your farm! Many older model tractors are still in use on farms in Canada, which is great, but these tractors were likely manufactured before ROPS were required. To prevent serious injury in the event of a tractor rollover, a ROPS should be installed on older model tractors still in use. Currently, farmers have the option to purchase a commercial ROPS specifically designed to fit their tractor make and model, however, the cost of pre-fabricated ROPS (between \$750 - \$2,000) often exceeds the value of the tractor and is an obstacle for farmers. The Roll Out of Low-Cost Farmer Built ROPS into a National Program project is working to offer farmers an alternative and more cost-effective solution by designing ROPS blueprint drawings that would be made available to farmers to build their own ROPS on the farm for about 25% of the cost of a commercial ROPS.

Concept

Simple weldable design that doesn't require journey-person skills to fabricate while still remaining structurally sound.



How Do You Design Blueprints for All Tractors?

There are numerous models of older model tractors in use in Canada that may need ROPS that will require numerous ROPS designs which are difficult to develop in a timely matter. A novel approach that utilizes parametric design has been conceptualized by the ROPS project team which will allow for fewer ROPS designs as this method accommodates multiple tractor models with one design. The parametric ROPS design takes the common aspects of a ROPS and turns it into a design drawing that provides a range of parameters that farmers can use to build a ROPS for their specific tractor model within a weight range.

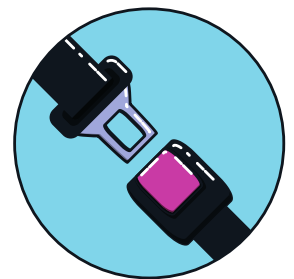
As part of the parametric design process, a target tractor weight range and representative set of tractor models were selected which included tractors with operating weights from 2,500 to 7,500 lbs and models which first entered into production between 1947 – 1973. There are 12 models included in this specific parametric design (see below).

Table of Tractors in Selected Weight Range

Label	Manufacturer	Model	Launch Year	Operating Weight (lbs)	Source
Ford 8N	Ford	8N	1947	2,717	NIOSH
MF 35	Massey Ferguson	35	1960	2,982	FARSHA
MF 135	Massey Ferguson	135	1964	3,130	NIOSH
Ford 3000	Ford	3000	1965	4,185	NIOSH
JD 1630	John Deere	1630	1973	4,650	FARSHA
Ford 4000	Ford	4600	1962	4,885	NIOSH
Ford 5000	Ford	5000	1965	5,740	NRRP
JD 2510	John Deere	2510	1965	6,200	NRRP
JD 3010	John Deere	3010	1961	6,500	NRRP
IN 656	International	656	1965	6,641	NRRP
JD 4010	John Deere	4010	1960	7,100	NRRP
JD 3020	John Deere	3020	1964	7,139	NRRP

This list is not intended to be exhaustive and other tractor models which fit within this range would also be suitable candidates for testing or design.

It is equally important to recognize that seat belts are a critical part of the effectiveness of a ROPS. Once ROPS details are completed, the seat belt mount will be determined to account for variances in different tractor models – the parametric design will work for this as well!



The ROPS project is proposing to develop a small group of three designs that will cover most of the older model tractors requiring ROPS in Canada.



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