

Fatality Assessment & Control Evaluation

Prevention through comprehensive research and investigation

INVESTIGATION/RESEARCH

In Michigan, since 2001, there have been 21 tractor overturns to the side or rear that have resulted in the death of the tractor operator. None of the tractors involved in the overturns were equipped with a Rollover Protection Structure (ROPS) and seat belt. ROPS/seatbelt retrofits are available for most of the tractors used in Michigan. By wearing a seat belt in a ROPS-equipped tractor, the operator most likely will not die or suffer a serious injury during a tractor overturn because he/she is kept within the "zone of protection" provided by the ROPS.

Note photo to left: Operator belted and within zone of protection.

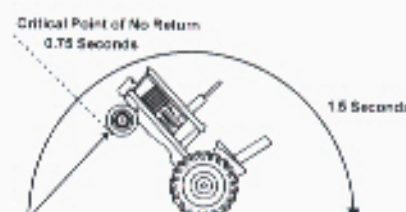
WHY BOTHER WITH A ROPS RETROFIT?



www.ags.psu.edu/extension/factsheets/e/E42.pdf

IN ORDER TO PREVENT SIMILAR INCIDENTS IN THE FUTURE

- **Maintain safe speed.** Match speed with terrain conditions.
- **Don't Let Tractor Bounce.** Could lose steering control.
- **Be alert.** Don't travel too close to embankment edge.
- **Turn Slowly.** Sudden turns create unstable conditions due to centrifugal force.
- **Start Slowly.** Do not rev engine or pop clutch.
- **Hitch Low.** Hitch to Drawbar. **Do Not** hitch above axle.
- **Increase stability.** Add wheel weights and use widest practical wheel spacing front and rear.
- **Keep heavy end of tractor pointed uphill on slope.** Back up steep slopes. Keep side-mounted equipment uphill.
- **Lock brake pedals** together before driving at transport speeds.
- **Back Out** if stuck in ditch, mud or if frozen to ground.
- **Do Not Coast** downhill on a slope. Keep in gear.
- **Wear seat belt** if tractor equipped with ROPS.



www.clemson.edu/farmsafetyandhealth/tractor.htm

DID YOU KNOW?

- 1 of every 10 tractor operators overturns a tractor in his/her lifetime.
- ROPS/seatbelt use is 99% effective in preventing death or serious injury if tractor overturns.
- Average cost of a retrofit ROPS/seatbelt kit is \$1000.
- Total direct and indirect cost of a fatal occupational injury on a farm is \$665,000.
- A homemade bar attached to the tractor axle may not protect the operator if the tractor overturns.
- All ROPS, including homemade, must be certified and have a certification label.
- Many farm tractors manufactured after 1960 have a ROPS retrofit available.
- Find out if a ROPS is available for your tractor: www.marshfieldclinic.org/nfmc/pages/default/

MIFACE: www.oem.msu.edu
MSU Extension: www.msue.msu.edu/portal/
Penn State Extension: www.ags.psu.edu/extension
National Ag Safety Database: www.cdc/nasd/
MIOSHA Standards:
www.michigan.gov/mioshastandards
TRAC-SAFE Facilitator's Manual:
www.cdc.gov/niosh/pdfs/tracsafe.pdf
Clemson Extension: www.clemson.edu/extension/

Hazard Alert #8

TO REPORT A NEW WORKPLACE FATALITY TO MIOSHA

1.800.858.0397

MICHIGAN FATALITY ASSESSMENT & CONTROL EVALUATION

INFORMATION: 1.517.353.1846
E-MAIL: debra.chester@ht.msu.edu

Tractors for Which ROPS Are Available
(Source: ROPS Directory, National Farm Medicine Center, Marshfield, WI) <http://www.marshfieldclinic.org/nfmc/pages/default.aspx>

	Allis Chalmers	Belarus	Bolens	Bolens/Iscki	David Brown	Duetz/Deutz Allis	Ebro	Fiat/Hesston
	160, 170, 175, 180, 185, 190, 190XT, 200, 500, 5020, 6040, 6060,6070, 6080, 7030, 7050	250, 250A, 250AS, 310, 400, 400A, 420, 420A, 425, 500, 505, 505A, 525, 800, 820	2289, 2389	1300, 1300F, 1500, 1500F, 1502, 1502H, 1504, 1704, 1704H, 1910, 1910F, 2102, 2104, 2420, 2420F, 2702, 2704,2902, 2904	1210, 3800, 780, 990	6260F, 6260LU, 6275F, 6275LU	350, 460	100-90, 446, 45-66, 466, 480, 545, 55-46, 566, 580, 60-66, 60-90, 645, 65-46, 666, 680, 70-66, 70-90, 780, 80-66, 80-90, 880, 90-90, 980
	Hustler	IMT	Jacobson	Lamborghini	Landi	Minneapolis Moline	Mitsubishi	Oliver
	3200	All Models	E-10, F-10, G10	480, 485, 704, 804, 904, C-340, R-174, R-235DR, R-503, R-603, S-470	5830, 5860, 6830, 6860, 7830, 7860, 8830, 8860	400, 500, M-5, MY-40	MT300D, MT160, MT180, MT210, MT250, MT300, MT4501	1470, 1655, 1755, 1855, 1955, 550, 555, 1250, 1850, 2-44, 2-62, 2-63, 2-78, 4-115, 500, 5S, 77, 88, 880, M-68
								Round/Square fenders: 1270, 1365,1370
	Ransomes	Renault	Satoh	Universal	Valmet	White	Worthington	
	MTR-350-D	651-4, 651-A, 651-S	S630, S650, S670, S750	350, 445, 453, 530, 530HC, 533, 640, 703	665	2-30, 2-45, 2-50, 2-55, 2-60, 2-65, 2-70, 2-75, 2-85, 45-62, 700, Field Boss 31	G-6	
	Case, Case/IH International	Case: 1030, 1070, 1090, 1150, 1150C, 1170, 1175, 1190, 1194, 1200, 1210, 1212, 1270, 1290, 1294, 1370, 1390, 1394, 1410, 1412, 1490, 1494, 1530B, 1537, 1594, 1690, 1700, 1737, 1740, 211B, 240, 284, 430, 440, 450, 470, 480, 500, 530, 570, 580, 680, 730, 750, 770, 780, 830, 870, 880, 885, 930, 970, 990, 995. Case/IH: 235, 255, 265, 275, 385, 395, 485, 495, 585, 595, 685, 695, 885, 895, 995, 3220, 3230, 4200, 4210, 4230, 4240. IH: 100, 1026, 1066, 1206, 1256, 130, 140, 1456, 1466, 1468, 1544, 1566,1568, 1656, 2300, 234, 2400, 2404, 2424, 244, 2444, 245, 2500, 2504, 254, 2544, 2606, 2656, 2706, 274, 2756, 284, 300, 3088, 3200, 3414, 3444, 350, 3514, 354, 3616, 364, 3800, 384, 3850, 400, 424, 444, 454, 464, 474, 504, 544, 574, 584, 606, 656, 664, 666, 674, 684, 686, 706, 756, 766, 784, 786, 806, 826, 856, 866, 884, 966, 995. IH Hydro: 100, 70, 84, 86						
	Massey Ferguson	25, 30, 31, 40, 40B, 50, 50A, 50C, 65, 70, 130, 135, 150, 150 RC Diesel, 154, 154-4, 154-S, 165, 174-S, 175, 180, 184, 184-4, 194-S, 205-2, 205-4, 210, 210-2, 210-4, 220, 220-2, 220-4, 230, 235, 240, 245, 250, 253, 254, 255, 265, 270, 274, 275, 282, 283, 285, 290, 294, 298, 302, 304, 33, 35, 356, 360, 375, 390, 398, 399, 401, 470, 1010, 1020, 1030, 1040, 1080, 1085, 1100, 1105, 1130, 1135, 1150, 1155, 2135, 2200, 2244, 3165, F-11, TEA						
		Low Profile: 375, 390, 398, 399. Orchard: 135, 235, 245. Narrow: 245. Round Axle: 245. Square Axle: 245, 255, 265, 275, 285						

Ford/ New Holland	260C, 340, 1000, 1100, 1110, 1120, 1200, 1210, 1220, 1300, 1310, 1320, 1500, 1510, 1520, 1530, 1600, 1620, 1630, 1700, 1710, 1720, 1725, 1900, 1910, 1920, 1925, 2000, 2100, 2110, 2110LCG, 2120, 230ALCG, 231LCG, 2310, 250C, 2600, 260C, 2610, 2810, 2910, 2910LCG, 2N, 3000, 3000NV, 3100, 3230, 3300, 335TL, 335TL/TLB, 335T, 340TL, 340TLB, 3400, 3400T, 3400TL, 3400TL/TLB, 340AT, 340ATL, 340ATLB, 340BT, 340BTL, 340T, 3415, 3430, 345C 345D, 3500, 3500T, 3500TL, 3500TL/TLB, 3550T, 3550TL, 3550TL/TLB, 3600, 3600N, 3600NO, 3600V, 3610, 3610NO, 3910, 3910N, 3930, 3930N, 3930NO, 4000, 4022, 4100, 4100O, 4110, 4110LCG, 4110N, 4110NO, 4140SU, 420T, 420TL, 420TL/TLB, 4200, 4400, 4400T, 4400TL, 4400TL/TLB, 4410, 4410T, 4410WOODS, 445T, 445TL, 445TL/TLB, 445AT, 445ATL, 445TL/TLB, 445C, 445D, 4500, 4500TL/TLB, 4600, 4600NO, 4600O, 4600SU, 4610, 4610LCG, 4610N, 4610NO, 4610O, 4610SU, 4630, 4630O, 4630N, 4630NO, 4830, 4830O, 4830N, 545C, 545D, 5000, 5011, 5030, 5030O, 5100, 511TL, 515T, 515TL/TLB, 5200, 530LCG, 530ALCG, 530B, 531LCG, 532, 532T, 535TL/TLB, 540, 540T, 540 TL, 540TLB, 540AT, 540ATL, 540ATLB, 540BT, 540BTL, 540BTLB, 541, 545T, 545TL, 545TL/TB, 545ATL, 545ATL, 545AT, 545ATL, 545ATL/TLB, 545C, 545D, 550TL/TLB, 555TL/TLB, 5500, 5550TLB, 555ATLB, 5600, 5610, 5610S, 5610SPCL, 5640, 5640SL, 5640SLE, 5700, 5710, 5900, 600, 6000, 601, 611, 620, 621, 630, 631, 640, 641, 650, 650TL/TLB, 651, 660, 6600, 6600AP, 6600O, 6600RC, 661, 6610, 6610AP, 6610O, 6610S, 6610SPCL, 6610SPL, 6640SL, 6640SLE, 6640O, 6700, 671, 6170, 681, 700, 7000, 701, 7100, 7100AP, 7200, 740, 741, 750TLB, 7500TLB, 7541, 755TLB, 755ATLB, 7600, 7600AP, 7600RC, 7610, 7610AP, 7610S, 7700, 771, 7710, 7740, 7740O, 7740S, 7740SL, 7740SLE, 7810, 7810S, 7840O, 7840SL, 7840SLE, 800, 8000, 801, 811, 820, 821, 8210, 8240SL, 8240SLE, 8340SL, 8340SLE, 8400, 841, 850, 851, 8530, 860, 8600, 861, 8630, 8700, 871, 8730, 881, 8830, 8N, 9000, 901, 941, 951, 9600, 961, 9700, 971, 981, 9N, CM222, CM224, CM272, CM274, Dexta, Golden Jubilee, NNA, Balmer, County Super, Fordson, TW-5, TW-10, TW-15, TW-20, TW25, TW30, TW-35. Round & Square Axles: 2000 3000, 3600, 3610
John Deere	40, 300, 301, 310, 400, 410, 420, 425, 445, 455, 500, 510, 540, 544, 620, 644, 700, 710, 760, 820, 830, 860, 1010, 1020, 1030, 1120, 1520, 1830, 2010, 2020, 2030, 2150, 2155, 2350, 2355, 2550, 2555, 2750, 2755, 2950, 2955, 3010, 3020, 3130, 3140, 4020, 5010, F1145, M. Utility: 1020, 1030, 1120, 1520, 1530, 1630, 2020, 2120, 2840, 2940, 2950, 3130, 3140 Utility w/Collar Shift Trans: 820, 830, 920, 1040, 1140, 1250, 1450, 1640, 1650, 1830, 1840, 2030, 2040, 2150, 2155, 2240, 2350, 2355, 2440, 2550, 2630, 2640 Compact Utility: 650, 655, 670, 750, 755, 770, 850, 855, 870, 900 HC, 950, 955, 970, 1050, 1070. Utility w/TSS Trans: 2130, 2140, 2550 Utility w/High Platform: 2140, 2750, 2755. Utility w/Low Platform: 2555, 2750, 2755. Row-Crop: 2510, 2520, 3010, 3020, 4000, 4010, 4020, 4030, 4040, 4230, 4240, 4320, 4430, 4520, 4620, 4630, 5010, 5020, 6030. Row-Crop High-Crop: 2510, 2520, 3010, 3020, 4010, 4020, 4230, 4430
Kubota	B1550DT/E/HSD/HSE, B1550E/DT/HSE/HSD, B1750DT/E/HSD/HSE, B1750E/DT/HSE/HSD, B2150E/DT/HSE/HSD, B4200, B4200DT, B5100, B5100D/E, B5200D/E, B5200E/DT, B6000, B6000C/ET, B6100/DT/E/HSE, B6100D/E, B6100D/E/HSD/HSE, B6100E/DT, B6100HSE/HSD, B6200D/E/HSD/HSE, B6200/DT/HSE/HSD, B6200E/DT/HSE/HSD, B7100D/E/HSTD/HSTE, B7100D/HSD/HSE, B7100DT/HSD/HSE, B7100E/DT, B7100HSE/HSD, B7200D/E/HSD/HSE, B7200E/D/HSD/HSE, B7200E/DT/HSE/HSD, B7200E/DT/HSE/HSD, B8200E/DT/HSE/HSD, B9200E/DT/HSE/HSD, F2100, F2400, GF1800E, KH10D, L175, L185, L185DT/FP/TP, L200, L210, L225, L235F/DT, L245, L245DT/FP, L245DT/FP/TP, L245H, L245HC, L260, L275F/DT, L285, L295/DT, L295DT/STD, L295F/DT, L305, L305/DT, L345, L345/DT, L355S, L2050F/DT, L2250, L2250F/DT, L2350F/DTL2350F/DT/GST, L2650F/DT/GST, L2850, L2850F/DT/GST, L2950F/DT/GST, L3250F/DT, L3350DT, L3450F/DT/GST, L3650F/DT/GST, L3750, L3750F/DT, L4150, L4150DTN, L4150F/DT, L4350MDT/HDT/HDT-W, L4850HDT-W, L5450HDT-W, M3000, M4000, M4030F/DT, M4030SU, M4050/DT, M4050DT/F, M4050F, M4050F/DT, M4500/DT, M4500F/DT, M4950F/DT, M5030F/DT/SU/SUMDT, M5500/DT, M5500F/DT, M5950F/DT, M6030DTN/DTN-B, M6030F/DT, M6950F/DT, M7030F/DT/SU/SUDT, M7030N/DTN-B, M7500/DT, M7500F/DT, M7580DT, M7950F/DT/HC/W/DTM, M8030F/DT/DTM, M8580DT, M8950F/DT, M9580DT, R310, R400, R410, R510
Long	4-1, 5-1, 1100, 1100DT, 1110, 1110DT, 1300, 1300DT, 1310, 1310DT, 2260, 22610DTCSD, 2310, 2350, 2360DTC, 2460, 2460DTC, 2460DTCSD, 2460SD, 2510, 2510DTC, 2520DTCSD, 2510SD, 260, 260C, 260DT, 2610, 2610DTC, 2610SD, 310, 310C, 310DT, 310DTC, 350, 350DT, 360, 360C, 360DT, 360DTC, 370, 445, 445DT, 445SD, 460, 460DT, 460DT, 460DTC, 460DTCSD, 460SD, 460V, 510, 510DT, 510DTC, 510DTCSD, 510SD, 550, 550DT, 560, 560DT, 560DTE, 610, 610C, 610DT, 610DTC, 610DTCSD, 610DTEWT, 610SD, 900, 900DT, 910DT, FARMTRAC60
Zetor	10011, 10045, 10111, 10145, 10211, 10245, 12011, 12045, 12111, 12145, 12211, 12245, 3320, 3340, 4320, 4340, 5211, 5213, 5243, 5245, 5320, 5340, 6211, 6245, 6320, 6340, 7211, 7245, 7320, 7340, 7711, 7745, 8011, 8045, 8111, 8145, 8211, 8245