# DESIGN ANALYSIS AND FABRICATION

Polaris Transmission Option

Low

Engine Torque (ft-lbs)	Engine RPM	Eff. % CVT	CVT (ft-lbs)	CVT RPM	Trans. Ratio	Trans. RPM	Trans. Torque (ft-lbs)
13.7	3600	0.9	9.864	4050	4.5	810	39.9492
Eff. % Transmission	**Diff. Torque (ft-lbs)**	**Diff. RPM**	**Tire Dia. (in)**	**Circumference (in)**	**Speed (mph)**	**Total Force (lbs)**	**Cost**
0.9	143.81712	225	27.5	86.39379797	18.40776945	125.5131229	$394.00

High

Engine Torque (ft-lbs)	Engine RPM	Eff. % CVT	CVT (ft-lbs)	CVT RPM	Trans. Ratio	Trans. RPM	Trans. Torque (ft-lbs)
13.7	3600	0.9	9.864	4050	7.49	486.6488652	66.493224
Eff. % Transmission	**Diff. Torque (ft-lbs)**	**Diff. RPM**	**Tire Dia. (in)**	**Circumference (in)**	**Speed (mph)**	**Total Force (lbs)**	**Cost**
0.9	239.3756064	135.1802403	27.5	86.39379797	11.05940755	208.9096201	$394.00
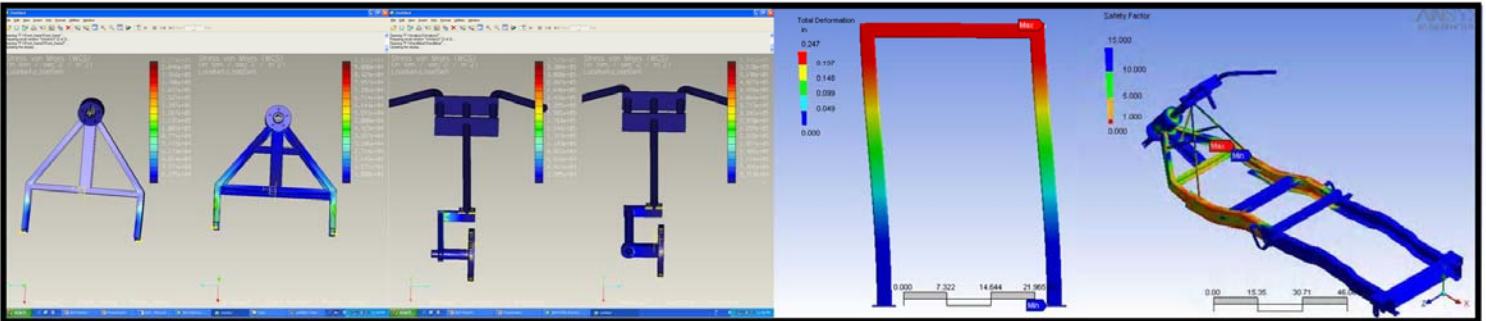
Pro/E FEA Analysis of the Front frame under critical loading of 3000 lbs where the arrows are located.

Pro/E FEA Analysis of the Handle Bar assembly under critical loading of 3000 lbs where the arrows are located.

ANSYS FEA Analysis of the Roll Over Protective device under critical loading. This picture shows the deformation of the ROPS when a load is applied on the top right hand corner.

ANSYS FEA Analysis of the Frame under critical loading. This picture shows the Safety Factor of the Frame.

The Formation of the Rear Frame

Pro/E Model of the BUV

Kyle welding the ROPS

Cory welding the front frame

Our Item List

Part	Make	Description	Cost	Quanity	Weight	Total Cost	Total Weight
Engine	Briggs&Stratton	I/C OHV 10HP	240	1	51.5	240	51.5
Rear Frame/ Differential	Junk Yard	The back end of a small truck.	150	1	200	150	200
CVT	Foxvalley Kart	CVT Transmission	200	1	25	200	25
Transmission	Polaris	CVT Transmission with reverse	375	1	40	375	40
Water Pump	Cheap	10 gpm water pump	250	1	15	250	15
Fabrication Materials	Junk Yard	Extra Metal, Extra Parts	100	1	50	100	50
Lights	AutoPartsBuy.com	Head light off a truck	0	1	1	0	1
Driver Seat Belt	Seatbeltpros.com	Non-retractable, 60 inch lap push button	0	1	1	0	1
Seat	Wal-Mart	Plastic Seat	7.28	1	5	7.28	5
Bolts	Lowes Hardware	Different Sizes	0.75	25	0.25	18.75	6.25
Nuts	Lowes Hardware	Different Sizes	0.75	25	0.25	18.75	6.25
Welding Material	ABE Department	Welding material				0	0
Fire Extinguisher	Lowes Hardware	BC Dry Chemical 2 lbs fire extinguisher	10	1	2	10	2
Horn	Wal-Mart	Bell Horn	4.96	1	2	4.96	2
Kill Switch	Briggs&Stratton	35 kill switch	8	1	1	8	1
Tow Hooks	jcwhitney.com	Tow hooks	14.99	2	4	29.98	8
Anti Roll Protection	Fabrication	Made from tube steel	25	1	25	25	25
Light Reflectors	Wal-Mart	Reflected surface	5	2	1	10	2
Paint	Wal-Mart	spray paint and primer	15.99	3	1	47.97	3
Front Suspension	Junk Yard	front suspension off an ATV	25	1	25	25	25
Throttle	Junk Yard	Throttle off an ATV	5	1	1	5	1
Parking Break	Junk Yard	Parking Break off a Truck	5	1	1	5	1
Pulley Belts	Foxvalley Kart	Used to drive clutch	20	2	1	40	2
Towing Costs			80	1		80	0
Tires	McCord Tire	Titan Hi-Traction Lug R-1 7-14 Tire	82.4	2	27	164.8	54
Battery			39.99	1	50	39.99	50
Alternator			39.99	1	16	39.99	16
Steel	ABE Department	Used to make the front frame	65	1	200	65	200
Lumber	Lowes Hardware	For the Bed	139.8	1	70	139.84	70
Unexpected Pricing			250	1	0	250	0
Total Cost						**2350.31**	
Total Weight							**863**

PURDUE UNIVERSITY

Basic Utility Vehicle
Kyle Anderson Cory Geers   ABE