

Instrumentation and Data Collection of a Debaler

UI Debalers

Hope de Avila, Nathan Stout, Benjamin Zimmerman College of Engineering, University of Idaho

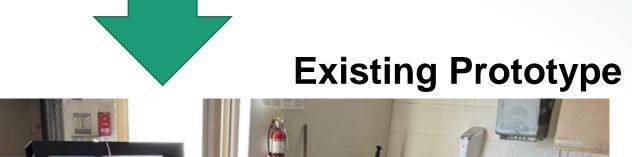
Introduction

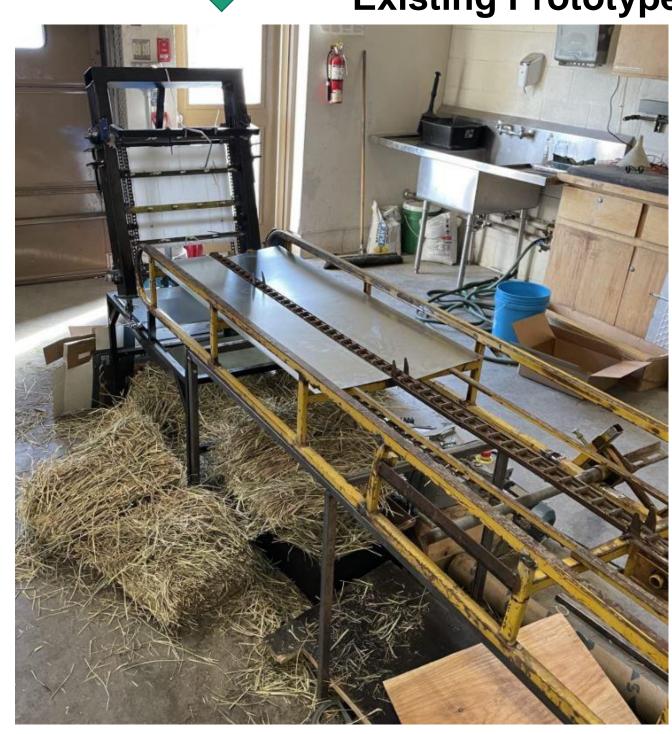
Baled materials are commonly used as a feedstock for biofuels or other bio-based products. The industry needs a machine that takes the bales and returns them to loose material.



Previous Prototype







This project, UI Debalers 2.0, is a continuation of a previous capstone project. That team, the UI Debalers, built the prototype seen to the right, that our team inherited. The existing machine is comprised of a manual infeed table, a debaling head, and an outfeed chute.

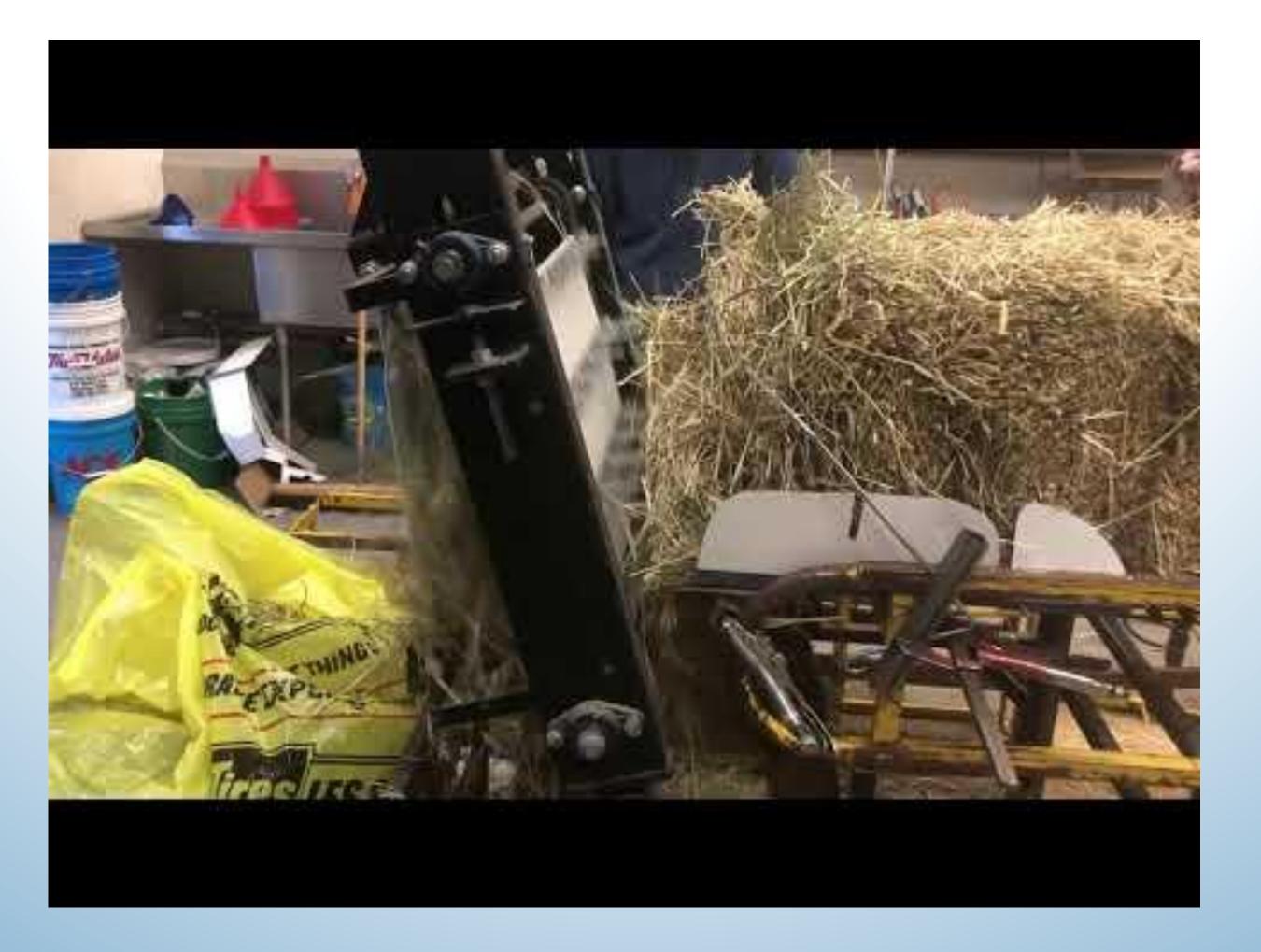
Objective

The objective of our project is to improve the current debaler prototype by making the system fully automated. Meaning a person loads a bale and machine takes it and debales without any further human interaction. We also need to incorporate a working control algorithm to sense bale jamming and chute clogs.

Project Goals

- Improve prototype chute
- Modify head
- Full automation
- Control algorithms





Current Design Ideas

- Add paneling around debaler head and connect it to the chute to ensure that all loose material flows the chute
- Install a door into the paneling to allow the operator to access the turnbuckle

Plan

- Construct box to surround debaler head that ties into material chute
- Move motor mount for hay elevator motor
- Build new motor mount for debaler head motor
- Construct sheet metal enclosure for the electronics
- Wire all electronics
- Code and implement automation logic trees:
 - Bale jamming
- Final material testing



References:

UI Debalers Design Report: http://mindworks.shoutwiki.com/wiki/Debaling_Agric ultural_Materials

forestconcepts

Project:	UI Debalers	2.0										
Last Updated												
		2020-2021										
Expense Items	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr		Total		
Supplies / Parts / Services:												
Hay Elevator			\$ -						\$	-		
Motors						\$ 206			\$	206		
Frame Material			\$ 40						\$	40		
Misc. Hardware						\$ 100			\$	120		
PLC and Power Source			\$ 121						\$	121		
VFD						\$ 306			\$	306		
Sheet Metal					\$ 90				\$	90		
Chain						\$ 50			\$			
									\$			Expenses
											\$ 883	Subtotal
Shop Usage (est. Hrs):							0			Hours		
10										10		
						Grad	uate Stude	nt Support	\$		including	fringe
							Shop	Overhead	\$			
							University	Overhead	\$	44	5% of all	expenses
								Totals	\$	927	\$ 965	\$ 38
											Budget	Excess

Capstone Project Schedule To	T									Due	Date	WIP	Done	Futu	re			
	2021																	
	Jan			Feb					Mar								May	
Task Description	1/6	1/13	1/20	1/27	2/3	2/10	2/17	2/24	3/3	3/10	3/17	3/24	3/31	4/7	4/14	4/21	4/28	5/5
Design Expo Registration																		
Engineering Release Review																		
Logbook																		
Team Member Citizenship																		
Snapshot 3																		
Team Portfolio/Wiki Page Update																		
Logbook																		
Ехро																		
Course Deliverables																		
Infeed Design																		
Infeed Assembly					П													
Control Algorithm Design					П													
Controls Parts Order																		
Controls Assembly and Testing					П													
Processing Head Cleaning/Testing																		
Head Parts Order																		
Head Assembly																		
Shroud Assembly																		
Material Processing Testing					П													
Final Design					\Box													