

# Advancing Environmental and product safety at Sun Mountain Sports

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Advisor: **Dybdal, Steven and Greer, Carrie**

Employer: Sun Mountain Sports



**MTP2**  MONTANA POLLUTION PREVENTION PROGRAM

EMPOWERING BUSINESSES TO BE PART OF THE SOLUTION, NOT THE POLLUTION.

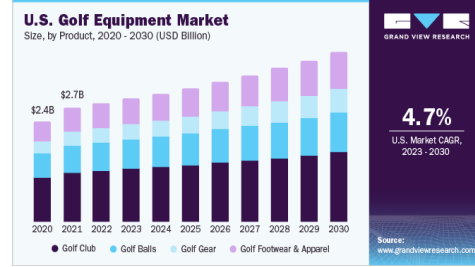
# Self-Introduction



- Professional/career interest
  - BSc. Microbiology
  - MSc. Environmental Microbiology
- Environmental challenges
  - Forever chemical (PFAS)
- Why join P2
  - Research on alternative to PFAS and PFAS compliance.
  - Applying LEAN principle to identify chemical waste

# Significance Of Golf Industry

- Revenue Generation
- Employment, Revenue
- Community and Charity
- Innovation and Technology



**4.7%**  
U.S. Market CAGR,  
2023 - 2030

## Charitable Impact Climbs to \$4.6 Billion

Golf has proven to be a tremendous vehicle for fundraising, both through outings and events at local golf courses as well as nationally-recognized professional tournaments and events.

In 2022, the total amount of money that golf raised for various charitable causes was almost **\$4.6 billion**, a **16% increase** compared to 2016 (\$3.9 billion)<sup>2</sup>. The majority of giving – **over 90%** – was driven by events at local courses, with 4-out-of-5 facilities holding at least one charitable golf tournament or outing in 2022.

### ECONOMIC CONTRIBUTION

TOTAL IMPACT (DIRECT, INDIRECT & INDUCED)

**\$226.5B**



GOLF ECONOMY

**\$101.7B**



EMPLOYMENT

**1.65M Jobs**



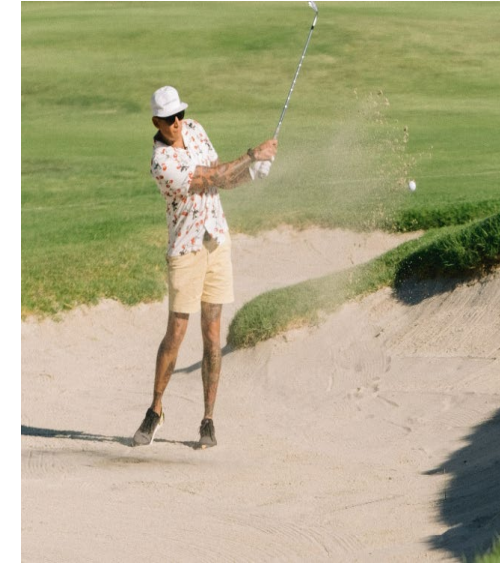
WAGES AND BENEFITS

**\$80.1B**



GOVERNMENT TAXES

**\$29.6B**



## ISSUES

- Environmental pollution



# Company Introduction



## OWNERS

- Founded in 1981 by Mr. Reimers
- Acquired by Solace Capital Partners in 2022

## PRODUCTS

- Sun Mountain is a pioneer in the golf industry known for its best-in-class brand and many innovations in golf bags, push carts, and outerwear

## EXPRESSED P2 INTEREST

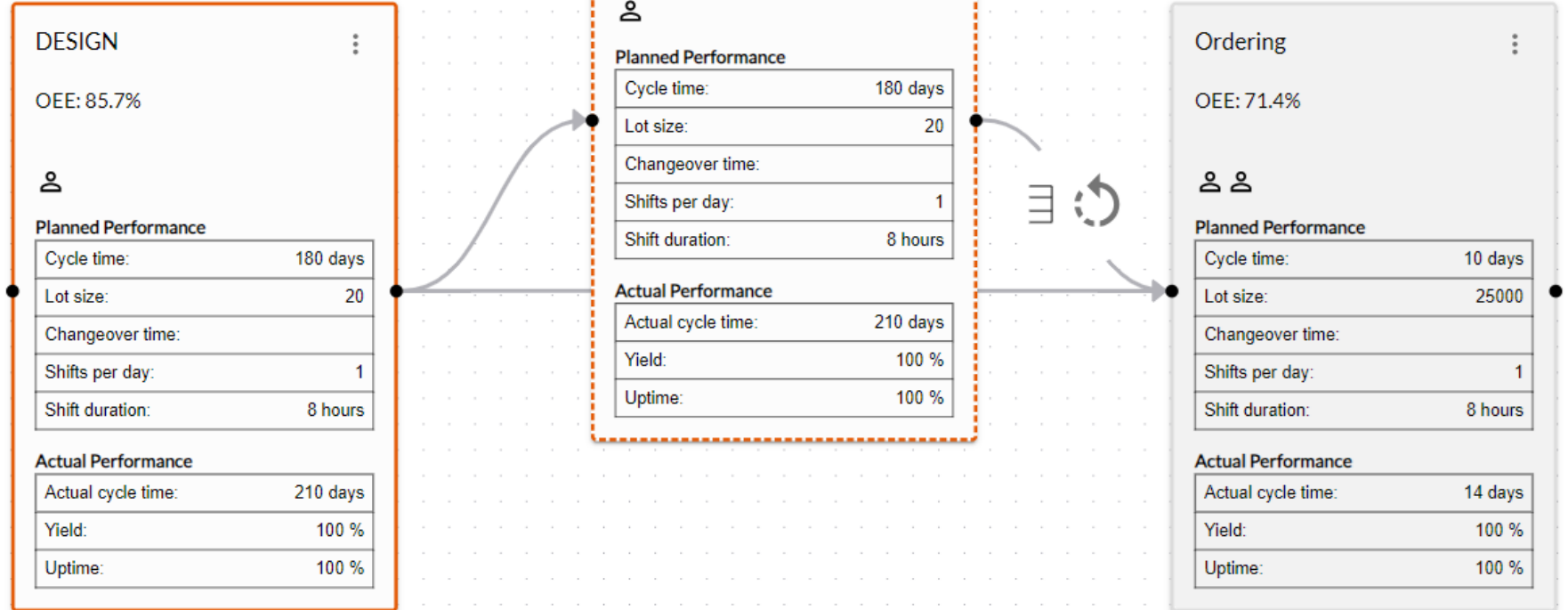
- Alternative to PFAS
- PFAS Compliance



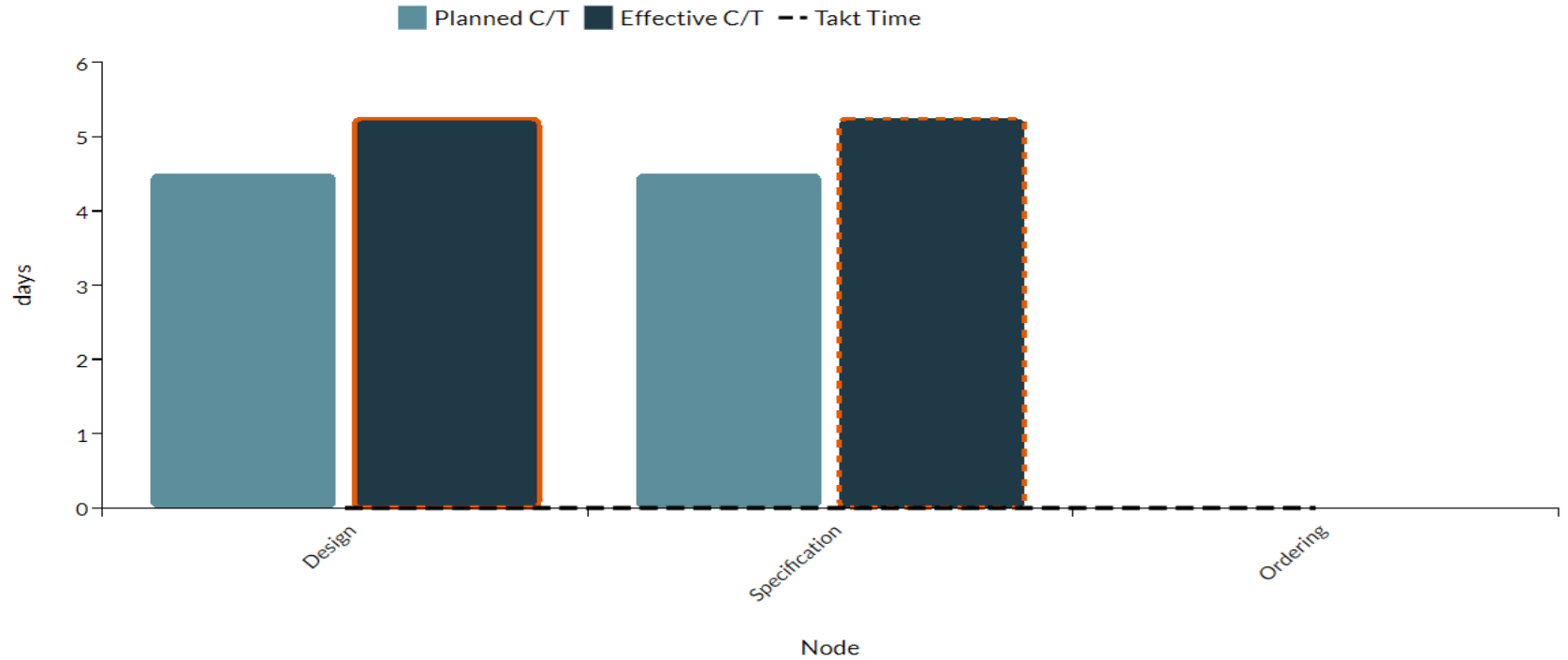
**SUN MOUNTAIN SPORTS**



# Value Stream Mapping of Golf Bags at SMS Design and Development



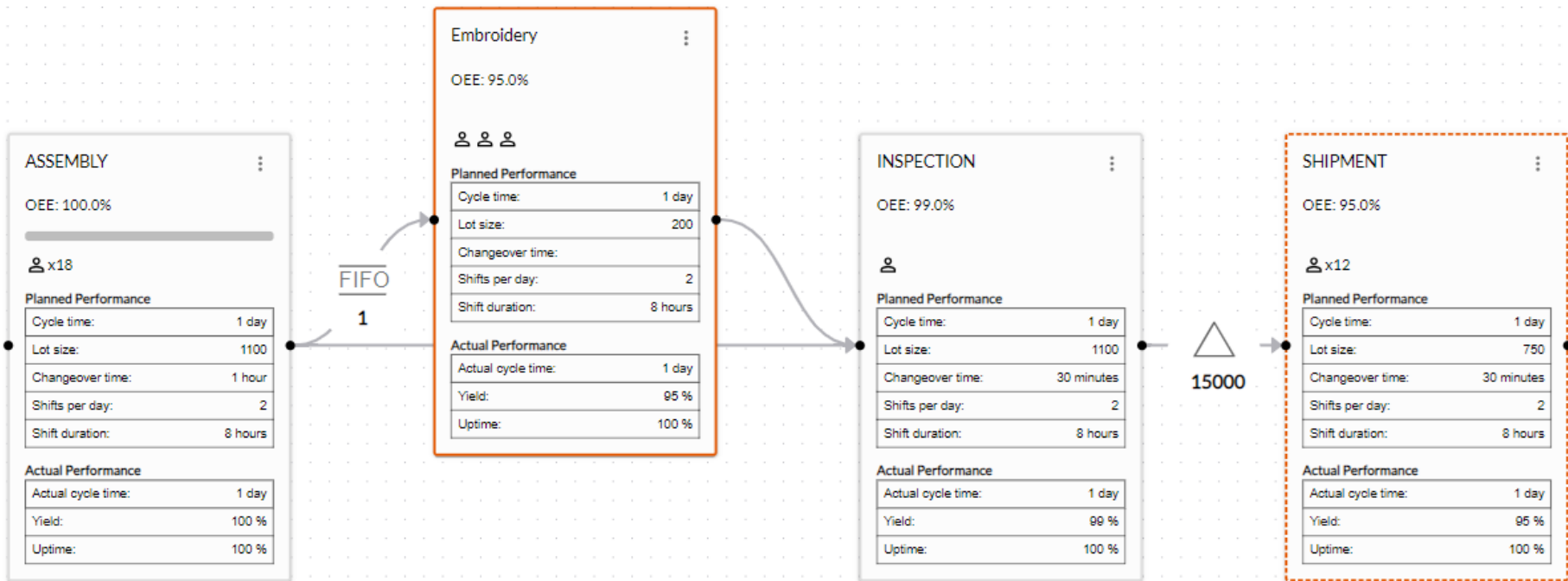
# Line Leveling For Design and Development



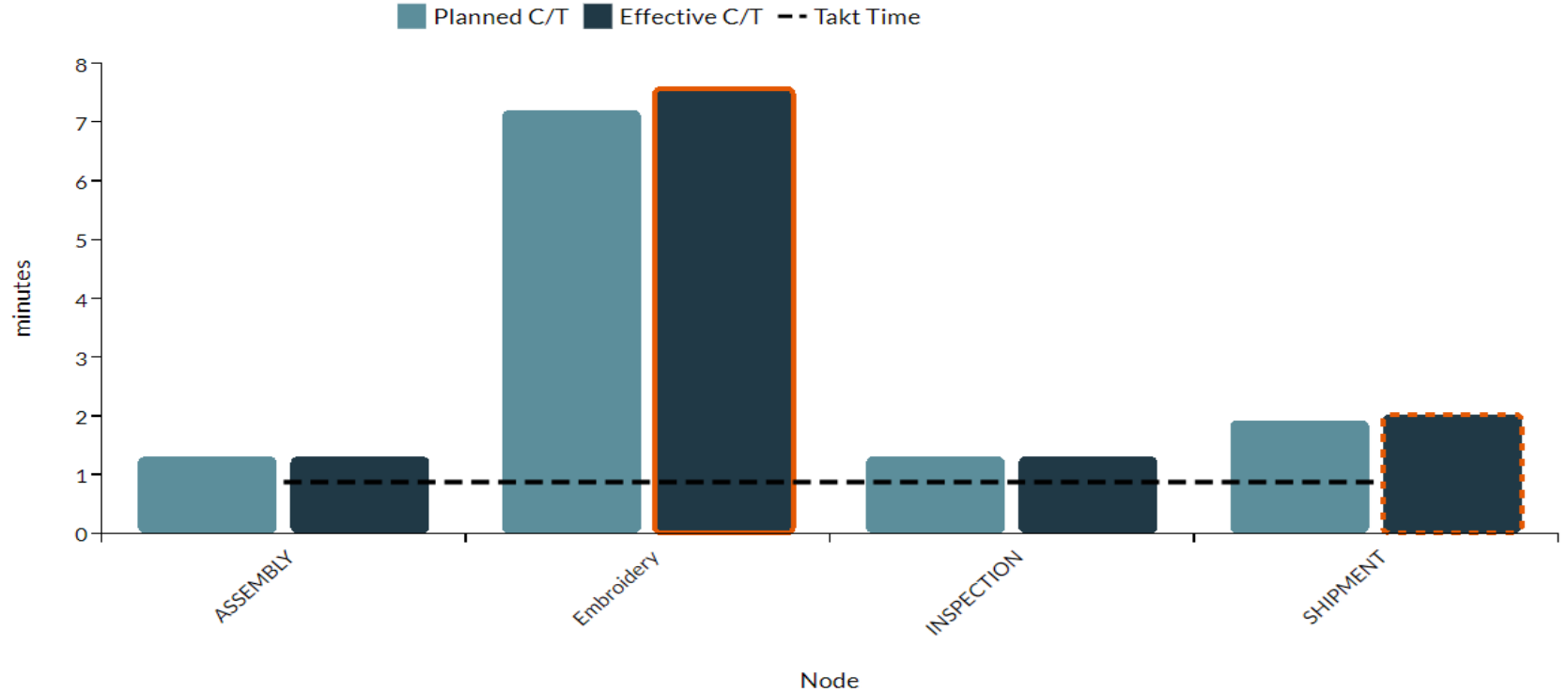
## Insights

Takt Time:

# VSM for Production and Assembly



# LINE LEVELING FOR PRODUCTION AND ASSEMBLY



## Insights

Takt Time: 52 seconds



# Pollution Prevention Focus- Chemical Waste

Problem/waste



- C6 Fabrics Treatment
- Inventory with PFAS > 100ppm
- Policies and Regulations

## Environmental Impact



- Persistence and Bioaccumulation
- Water Contamination
- Human Health Risks(Cancer, Liver damage)

Goal



- Reduce Chemical Waste
- Prevent Future Chemical Waste

Strategies



- R & D for C0 Alternative
- Federal Reporting
- Supply chain Management

# Trials And Results

## Compliance



- Total organic fluorine <100ppm.
- Federal Reporting Account Created.
- Document of all Policies and Regulations related to PFAS.
- Initiated membership for PFAS newsletter alert.

- Identified several Alternative to PFAS.
- Ongoing Trial on C0 alternative.
- Drafted Hand tag for customer education.

# Life cycle Analysis

Stages	PFAS-Containing Bags	PFAS-Free Bags
Raw Material Treatment	High energy consumption and release of harmful byproducts	Potentially higher extraction energy. But Safer chemical profiles
Manufacturing	Significant emissions of hazardous chemicals	Reduced hazardous emissions to workers and the environment
Transportation	Similar transportation impacts, depending on the distance and mode of transport	Similar transportation impacts, depending on the distance and mode of transport
Usage	PFAS materials typically have high durability and performance	PFAS-free materials must meet or exceed the durability and performance of PFAS-containing materials
Usage	Generally easy to clean and maintain	Ease of cleaning and maintenance may differ, impacting the overall user experience
End-of-Life	Persistent in the environment. Challenges in disposal and recycling	Easier to recycle or safely dispose. Reduced long-term environmental impact

## Future State design

- **Continuous R&D on the alternative**
- **Supplier collaboration**
- **Prototyping and Testing**
- **Documentation and Reporting**
- **Life cycle Analysis**
- **Customer education (Marketing and Branding)**
- **Compliance department to Continuously Keep track of regulations**



# P2 Outcomes

Recommended P2 Actions	If Implemented				If not Implemented	
	\$		Annual Reduction			
	One-time Cost to Implement (\$)	Annual Savings from P2 Action	Air emissions (lbs)	Chemical use(ppm)	Barrier to Implementation	Plans to Implement within 5 years? (Pick Y/N)
PFAS free product	TBD	TBD	N/A	TBD	Customer Acceptability	Y
Federal Reporting	TBD	TBD	N/A	N/A	Cost	Y

# Reflection/recommendations

## Personal Lessons



- **Learnt how to apply lean principles.**
- **Gained Project Management skills.**
- **Knowledge about golf bags making.**

## Future P2 interns



- **Ask questions**
- **Data is life, don't joke with it.**
- **Flexibility is key.**

## Recommendation for P2 focus



- **Creating a compliance department**

## Future P2 Advisors



- **Review interns achievement and progress regularly**



# Acknowledgment



- We acknowledge and honor that we are on the ancestral territories of the Indigenous Nations and Peoples, including the Apsáalooke (Crow), Niimíipuu (NezPerce), Šakówiŋ (Lakota), Piikáni (Blackfeet), Séliš(Salish), Shoshone-Bannock, and Tsétsêhéstâhese (Northern Cheyenne) Nations.
- We appreciate EPA for the fund released for this project.
- All thanks to MMEC for training on Manufacturing processes.
- Special thanks to Greer Carrie at SMS for the intern mentorship.
- We also appreciate Montana State University for giving us this opportunity to serve as their employee.
- Finally, we say a big thanks to MTP2 for creating such opportunity for interns to acquire project management skills.



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**THANK YOU**

**Questions !!!!!!!!**