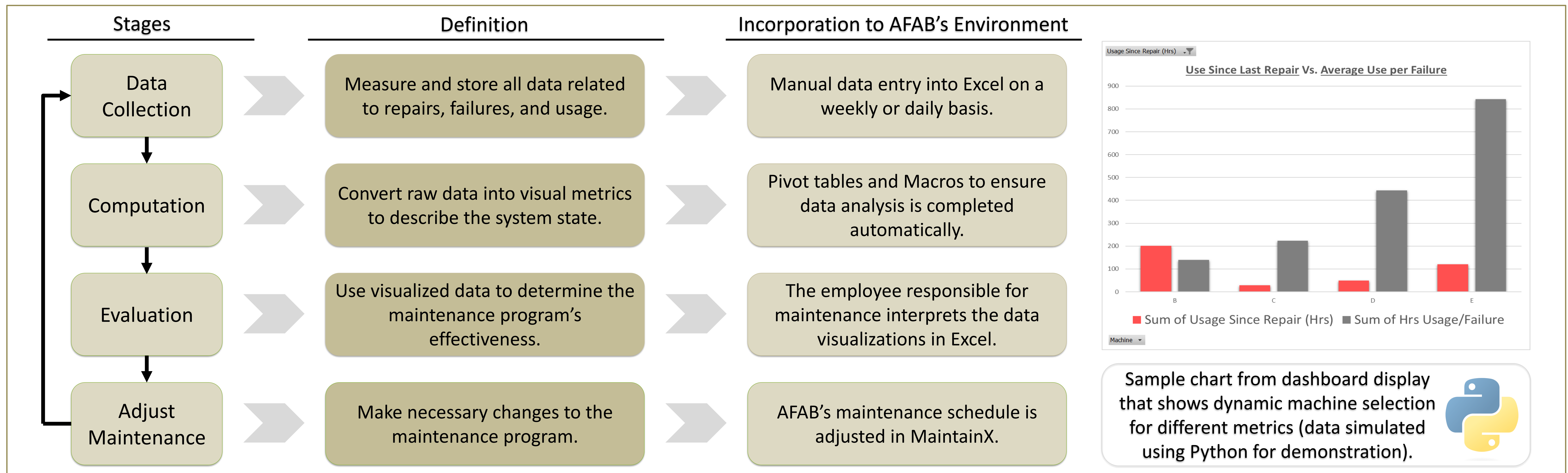


Introduction

Client Background: Applied Fabricators (AFAB) is an architectural sheet metal shop in Greenville, IN. They currently have about a dozen employees and twenty-eight different types of equipment. This family-owned business fabricates metal for the exterior of buildings including roof edge metal, single skin wall panels, z girts hats and strapping, trim metal, light structural clips, and any other brake metal items needed for construction projects. They serve Roofing, Glass & Glazing, Cold Storage, and wall panel sectors with pre-finished components as well as ancillary galvanized framing and stainless-Steel trim.

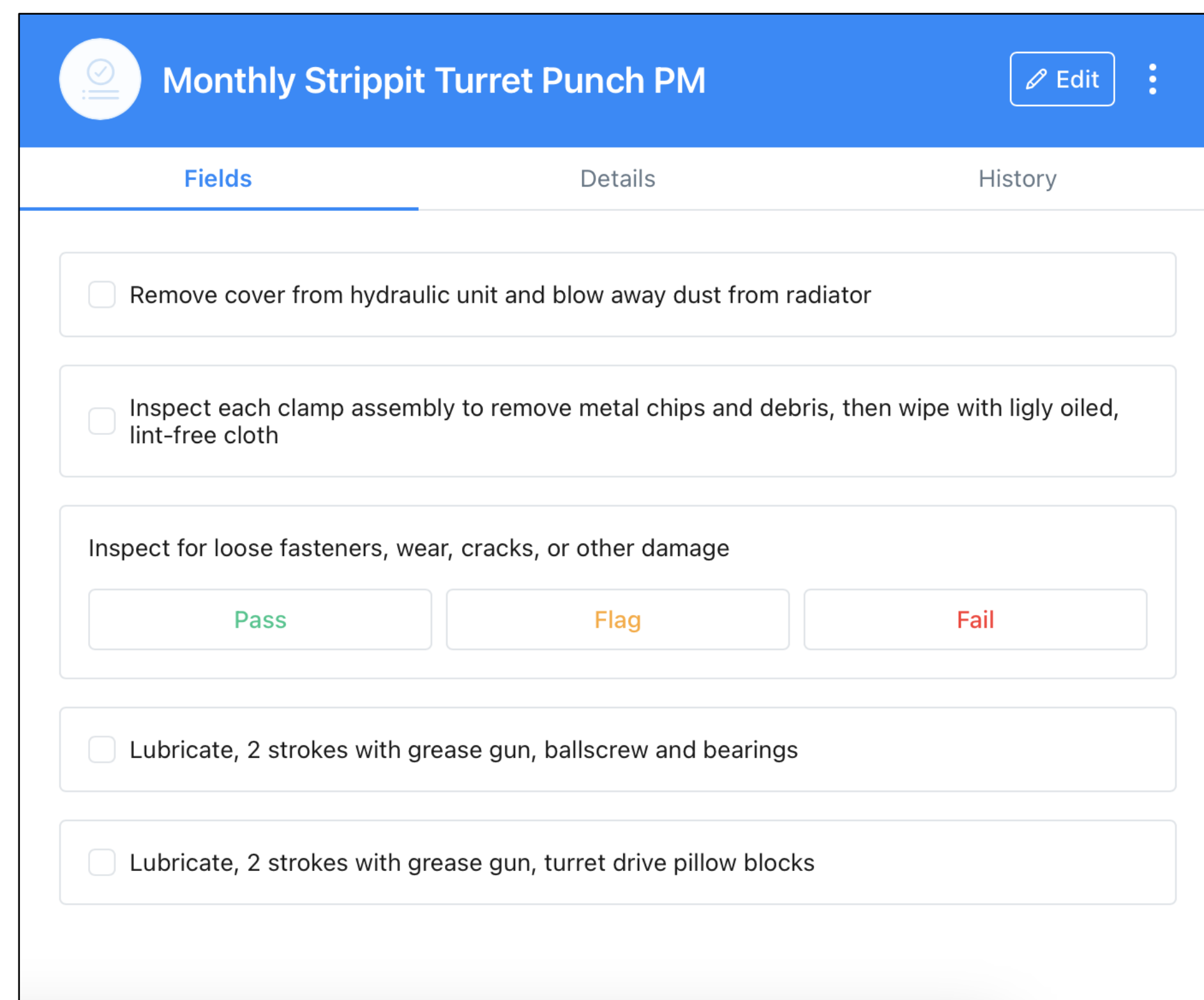
Problem Statement: Applied Fabricators has doubled their footprint in the last year. Currently, they have no scheduled maintenance procedure. As machines break, no data is recorded on the details of the failures. A new employee has been hired to conduct scheduled maintenance for the machines, and it is our task to build an optimal maintenance procedure for them. Our goal is to build a model that will give Applied Fabricators the tools to create and adjust the fixed PM schedule based on utilization and failure rates collected on each of their assets.

System Model: Preventative Maintenance Work Flow

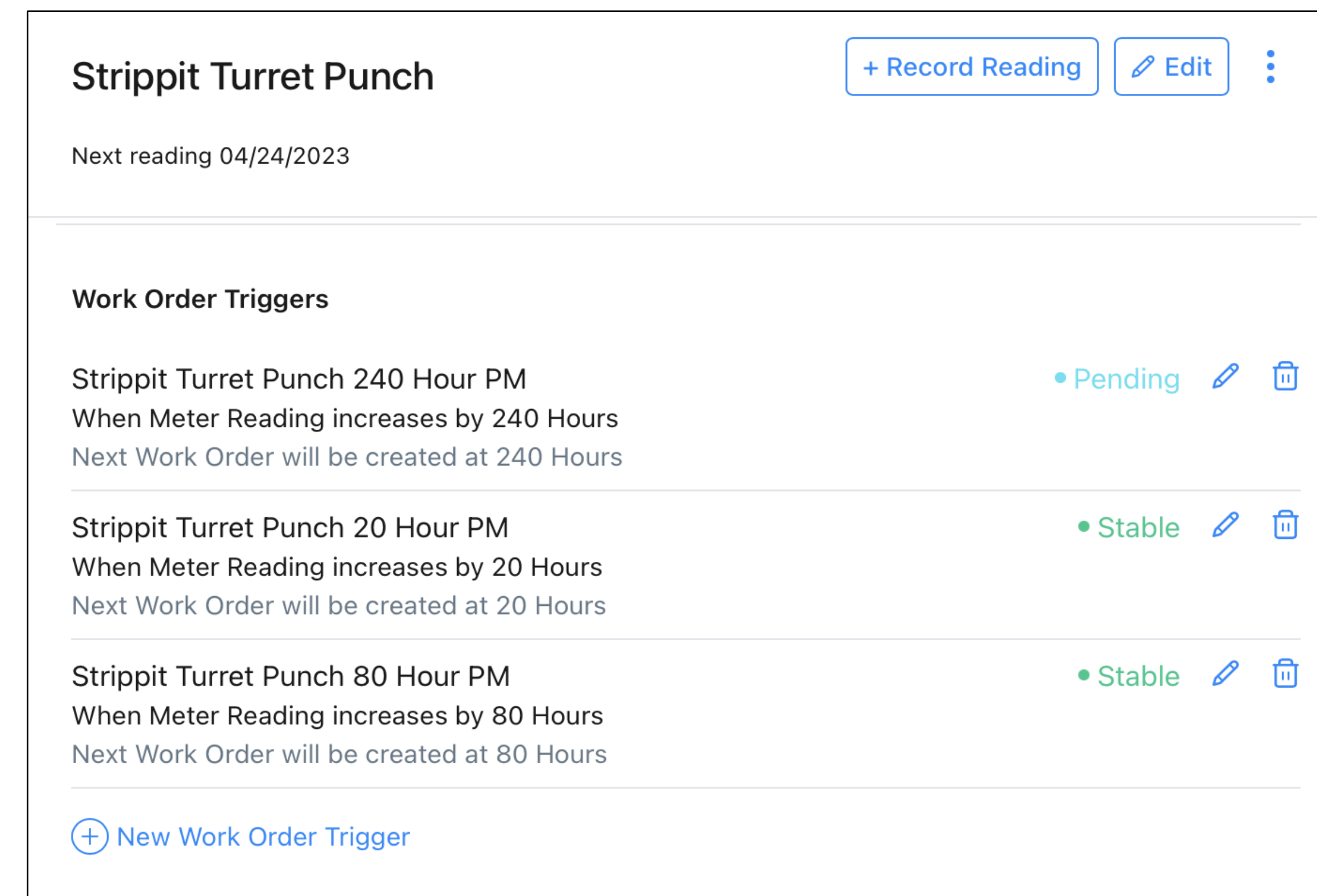


Methodology

The **fixed PM schedule** is housed in a web-based software called MaintainX where we created "Procedures" for the PMs for each asset in accordance with recommended maintenance in each asset's manufacturer manual. These "procedures" are then linked to a "work order" which is assigned and completed by AFAB's maintenance technician. Machines with hour meters create work orders linked to the respective procedure based on an operating hour trigger. These triggers were created based on the average weekly usage of each machine and/or in accordance with the manufacturer manual.



Sample MaintainX PM Procedure



Sample Work Order Triggers for Metered Asset

The **floating PM schedule** is housed in Excel and allows AFAB to adjust the fixed schedule by analyzing usage, failure, and repair data. This data is used to calculate useful metrics like "usage since last repair," "usage hours per failure," and "usage/failure ratio" which allow AFAB to move up a PM to diagnose failures before they occur or push back a PM due to abnormally low usage.

Results: Reflection on Design Specifications

- ✓ User Friendly – Macros Enabled Excel
- ✓ Usage-Based PM – Work orders trigger based on hour meters
- ✓ Historical Record – Created "database" using an Excel template
- ✓ Informed Maintenance Decisions – Provided visual display of performance metrics

Discussion

Machine	Last Repair	Usage Since Repair (Hrs)	Total Usage (Hrs)	Total Failures	Hrs Usage/Failure	Ratio
Baileigh Leaf Brake	4/4/2023	0	7	1	7.00	0%
Baileigh Magnetic Brake	1/30/2023	0	8	1	8.00	0%
Cidan EVO 40 12' Shear	2/10/2023	3	3	1	3.00	100%

These metrics are calculated in Excel using AFAB's usage data, allowing them to intuitively see if a machine is experiencing abnormally high or low usage and accordingly adjust the fixed PM schedule.