Deep Creek Outdoors, llc

GENERAL PROJECT INFORMATION

INTRODUCTION

Deep Creek Outdoors (DCO) is a recreational gear supplier in the Pacific Northwest. They have been in business since 2010, starting with the owners setting up shop out of their garages and selling their gear on eBay and Amazon. DCO has a focus on fishing gear and has been creative on making their own fishing lures. They also buy finished goods such as rods, reels, tackle boxes, etc from overseas suppliers and sell them at very attractive prices versus the competition. In 2013 they expanded into a 50K foot building to house their inventory and to also start a small manufacturing operation. The owners took on a new challenge with deciding to build their own branded fishing rods. This venture has not been as successful as they had hoped, and before scrapping the idea they want to analyze the current environment and make one last attempt to make it work. They have a strong brand position that they have worked so hard to build over the years and they cannot afford to have this manufacturing venture crush their business.

This document contains the necessary background information to be able to get to work on this project. This information includes a history of the business, a description of the business's current practices, and descriptions of key problems that have triggered this project.

You should assume that you are employees for the software consulting and development firm, Arch Systems (feel free to name your own business.) Your firm specializes in providing business solutions for small and medium sized organizations, and has established a reputation as a firm that delivers quality applications, on-time, on budget and with excellent functionality and documentation.

Note that, as with the documentation of many real-life projects, there may be errors and omissions in these case details, and in the documents provided during the course of the project. If you identify any of these, document them in the appropriate document(s) **and make reasonable assumptions** to move forward.

CASE DETAILS

Arch Systems have had an initial conversation with Mike Trout and Sam Lee , who are co-owners of DCO. In the last few years there has been a resergence of interest in all things regarding the outdoors, including fishing. As DCO currently does very well in the buy/sell market, and also in making fishing lures they wished to capitalize on their existing business and Brand to on-board a fishing rod manufacturing process.

After the building expansion in 2013 the owners decided to take advantage of excess floor space and install a fishing rod production capability, beginning in 2016. They started with 1 production line and are now up to 2, with the space capacity to add 2 more. Although production seems to be going well in meeting consumer demand it has become apparent the fishing rod venture is not as profitable as hoped, and that brand negatvity has increased since rod production began. As it turns out they have found (they think) customer returns on their fishing rods is around 30%, seriously degrading their profit margins, and also negatively impacting their brand. The current situation is that DCO is attempting to add a quality management process. Unfortunately the process is very manual and does not provide on demand, consolidated reports easily. This is slowing down their ability to get to the root causes of defects and solving the quality issues. Part of your work here is to understand DCO's system and processes as they are now (AS-IS) and then to model new functionality/processes. Then design a system, including User Interfaces, database architecture, user acceptance testing documents and user operation documention for a database application that will help save their brand in the marketplace. Arch Systems also should consider that an application such as this could have broader opportunities than what DCO needs. As an example, although lure production is quite easy, they do not have a production tracking or quality system in place to support lures either. Consider this in the design…Fishing rods today….tomorrow may bring other opportunities in this area for Arch, whether at DCO (lures & rods) or another manufacturing company in need of a similar solution.

In addition to the above, during your initial conversations with Mike and Sam, you took the following notes about the background of DCO.

BACKGROUND

Arch Systems was called in to help DCO build a cost effective quality management and production tracking system. 30% customer returns are not acceptable and before scrapping the rod production altogether, DCO wants to make one last attempt at saving this part of the business. The rods are excellent when they are defect free. DCO acknowledged that quality has not been at the forefront of the production endeavor. Mike and Sam assumed that everyone they hired would have the same level of quality mindset they had. Unfortunately, for many reasons, this has not happened. And to make things worse there has not been any systematic tracking of errors that are found during the production process. So no-one really knows where the biggest problems exist. Additionally, DCO does not have easy visibility to how many rods get produced per shift, per production line thereby making it hard to know if DCO is meeting production targets and the percentage of defects occuring on a production run. DCO agrees that their current information gathering and processes are not working and a new, more integrated system with process and user documentation is needed.

Currently, all employees have Windows based desktops or laptops. This includes a desktop on each production line. A local network running on Windows Server supports the connected devices. There is also a Virtual Private Network used by employees working from home or travelling. Mike has briefly outlined the duties of the paid staff involved. The production manager is Melissa Swift; Omar Sosa is the Quality Manager; Webster Ott is a quality analyst; Darlene Poe is the inventory and materials manager; Don Garelfs is the accounting clerk.

THE QUALITY PROBLEM

The members of the DCO advisory board meet on a monthly basis to review the existing production quality reporting and customer returns information. They do their best to put action plans for quality improvement in place, but the current information does not make it easy. On the customer returns all the data gathered is not categorized and is just a free-form document where the customer and our customer service rep can write anything down. This is good to "get their thoughts" but makes it very difficult to accumlate, analyze and consolidate with other return information.

On the production floor DCO has recently added a new analyst to help with gathering and reporting quality information but that has not gone well due to inconsistent systems available to record and track information. The ability to consistently assign, store and report on information is just not available. In addition, the quality team has not been part of reviewing the customer returns, so it is possible they are not seeing the product quality through the eyes of the consumer.

Each production line can currently make approximately 100 fishing rods per shift. See the product section for more information on the product offerings, costs and retail prices. Mike and Sam acknowledge that at times when sales are high, pressure can be put on production throughput and not all of the rods may get inspected, or receive the same level of inspection. They would like to easily review the production output by production line, batch and shift to monitor production levels.

THE QUALITY PROGRAM

The quality manager has convinced leadership that a final QA position is required at the end of each production line as the packaging clerk cannot keep up with consistent QA reviews at the same time of taking care of the packaging. Currently, the new DCO quality analyst has been learning about fishing rod making. He found that at the end of each production line, the packaging clerk is responsible for doing a final QA check, and if defects are found the clerk takes the rod out of production, tags it and places it in a holding area. At the end of each shift the production manager, or a designee must review each rod in the holding area to validate the defect. The production manager then takes the rod to the correct manufacturing process to fix the defect, or if the defect is extreme, will log the rod as a loss in the production quality manual and then destroy the rod. The new QA position role will do a final inspection and log each anamoly/defect for further review. This process has just started and is very manual, and does not lend itself to reporting over time, as it is all on a hard copy form. The QA manager and production manager sit down weekly to review these forms, looking for repeating errors. The manual nature of this process also makes it difficult to keep track of inventory. To make sure the

right product (rods, etc.) are being produced, DCO needs the ability to know what they have in stock for the finished rods. When production is completed, the inventory and location of each rod should be captured in the system. The location would be either Available in the warehouse, or Not Available in a holding area. DCO is open to ideas here. DCO also needs to know the materials they have available in stock to build the rods. They don't want to have production stopped because there are not enough materials available to manufacture the product. Again, the same could be said of lures, but they have not gone down this road yet.

It is possible for a rod to have defects in multiple areas, eg: bad paint and a bad guide. It is also possible that a defect could be **minor** (fixed by the QA person, such as left-over epoxy), **moderate** (must be taken to the correct work center to fix), or **Severe** (must be destroyed) severity.

See the current hard copy example of the QA form for further review.

The quality manager would like to be able to run many reports (Dashboards) from the production line QA process. Percentage of Defects versus non-defects, defects by work center, defects by defect reason/code e.g., mis-aligned guide, top 5 defects, defect breakdown by classification (minor, moderate, etc), defects by shift, etc.

The quality manager would also like to have reports showing the consumer returns information. Specifcally: Item returned, batch number of production, reason for return (selected from a list).

The production manager would like to know the inventory inventory information so they can effectively manage the production schedule and work with accounting on materials purchasing.

COST AND PRICE ESTIMATES

Classification	Item Numbers start with	Length Options	Guides	Handle	Reel Seat	Pieces	Cost (Material&Labor)	Retail
Good	GR...	5'6" - 7'	Metal	Plastic	Basic	1	12.00	25.00
Better	BR...	5'6" - 9'3"	Brass	Cork	Double Lock	2	20.00	99.00
Primo	PR...	5'6" - 10'6"	Composite	Composite	Double Lock	2	50.00	299.00

Note: Actions all cost/price the same, action is just a customer choice.

MANAGEMENT FINAL NOTES

Sam and Mike want to stay in the rod making business. However if they can not make money, or if their brand gets impacted further they may have no choice but to stop production. They feel with a good end to end (customer/customer returns and production) tracking system they will be able to attack the defects and build a quality product, every time.

Rod sales categories are roughly 20% good, 20% primo, and 60% better. They believe that most of the returns come from the primo category but they do not keep history beyond the monthly review of returns.

DCO needs a system and processes that will give them a chance to make a brand **improvement** and perhaps look at expanding further production capabilities. They are looking to Arch to help get them there.

INTERVIEW INFORMATION

DCO INTERVIEW NOTES

Interview Report

Interview Notes Approved By: _____

Person Interviewed: *Accounts Clerk, Don Garelfs*
Interviewer:
Date:
Primary Purpose:

Summary of Interview:

Maintains the Returns/Credit Information

When a customer wishes to return a fishing rod, they can call or email DCO for a return authorization code. DCO emails or mails the return form to the customer. The customer then packages up the rod and sends it, along with the return authorization code and the filled out form to DCO. 95% of these returns result in sending a new rod, free of charge to the customer. The other 5% are rods that are very simple to fix and return, or, in the worst case - refund the customer their purchase price. For lures, DCO just sends a new lure, no questions asked, no forms (or good tracking) required.

When a returned rod is received, the form is kept and reviewed during the monthly management meeting on Returned Product. There is no formal tracking or data capture of the returned product for further analysis.

Don would also like to work more closely with Omar regarding quality of incoming goods. There currently is no reporting to see if we have a supplier who is consistently sending bad product.

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Detailed Notes:

- Can we implement a Web Form for customer returns ?
- We need a system to track each return (Lures and Rods?) Is there a Lure reason code list?

Interview Report

Interview Notes Approved By: _____

Person Interviewed: *Production Manager, Melissa Swift*
Interviewer:
Date:
Primary Purpose:

Summary of Interview:

Melissa Swift is responsible for the production of DCO rods

Rod Production at DCO is scheduled on a "Build to Stock" scenario. Over time DCO has manually kept track of sales by model and length and has a good handle on the expected breakdown for rod finished good sales. As an example, the BR models in the 9'6" length, moderate action, are the most popular so more of those are kept in stock than other models/actions. This method of production and warehousing allows for a very quick turnaround on the majority of orders. Shipping in 1 to 2 days is very common and has been a cornerstone of the rod business to-date. It also allows for grouping and batching production runs, making the factory more efficient.

Each Production Batch gets serialized and printed on the rod, close to the handle. This production batch is meant to help with the analysis of returned goods, although that has not yet been put in to practice. An example batch id is: 191012-1. YYMMDD-Shift Melissa notes that as production lines have expanded, now at 2, it would be good to revisit the batch naming to consider what production line the rod was produced on and what batch number. And what about action? Should it be on there as well?

Melissa was not very happy to add a Final/QA role to her production lines. This added labor falls directly on her cost line and she is not sure how much benefit she.. or the company will receive from this "mandated" labor increase.

<u>Reports:</u> Melissa prepares a breakdown of what was produced, each day, each shift.

Notes:
- We need all this in a system, what was produced, when, what line, what were the Quality outcomes.
Melissa and Don both noted how nice it would be if inventory were in a system. Right now they have a manual system that keeps track of the raw materials (Fiberglass/graphite

sheets, guides, tips, handles, etc.) and also of the rods that have been produced. They would like a system that would take the production information and do two things: 1. Store the new products in inventory and 2. Auto decrement the raw materials used in production. (Instructor note: lets say it takes one strip of graphite for a rod, and they inventory the graphite in strips). DCO would also like a way to manually adjust inventory due to things that can happen to the items e.g., damage, waste, loss.

Can we provide incentive to Melissa and team for Quality production? We do need to keep track of defects to production… Also, Perhaps the final/QA role should report to someone else? We don't want them being pressured to let errors go in the sake of production meeting their targets. How do we get a culture of quality going here?!

Interview Report

Interview Notes Approved By: _____

Person Interviewed: *Quality Manager, Omar Sosa*
Interviewer:
Date:
Primary Purpose:

Summary of Interview:

Omar works closely with Melissa in Production and Don in accounts. Omar is responsible not only for quality rod production, but also quality of the goods we buy/sell, and also of the lures we make.

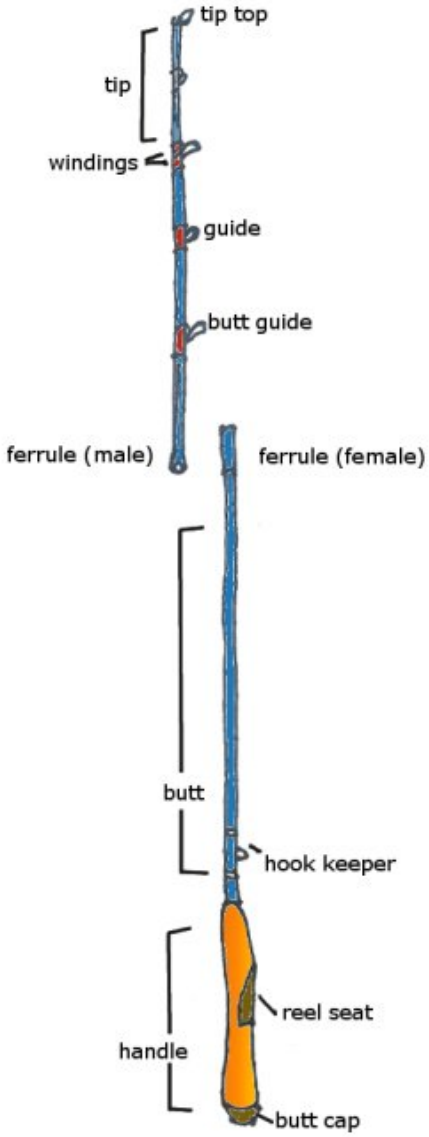
Quality Plan: Omar has a lot on his plate. He validates incoming goods for quality and deals with our suppliers if there is an issue. Omar has had to travel to supplier locations to straighten out quality issues with fishing reels we buy and sell. We buy many parts for the lures we make and this incoming quality check has been invaluable as it ensure we don't build lures with "bad product." Our lure production is 99+% no returns. Omar did not play a big part in the rod production to begin with. When rod production first started we were making so few rods that each one was basically a "custom build" and had experts making it. As word started to spread of our quality product, production ramped up. During this ramp up the quality aspect was assumed to be there. Only recently has DCO realized we have a bigger quality problem than we thought. Omar has attempted to get a quality system rolling but at first it was deemed too expensive. In the last few months though, the business has come to the realization how important this could be for their business and is willing to invest in solving the problem. They had a good start by hiring a quality analyst for production, but now they need help with processes and systems.

Reports: Omar is looking for help in validating the form design for doing quality checks. When completed Omar expects this data to be stored and retrievable through reports, dashboards, downloads, etc.

Open Items:

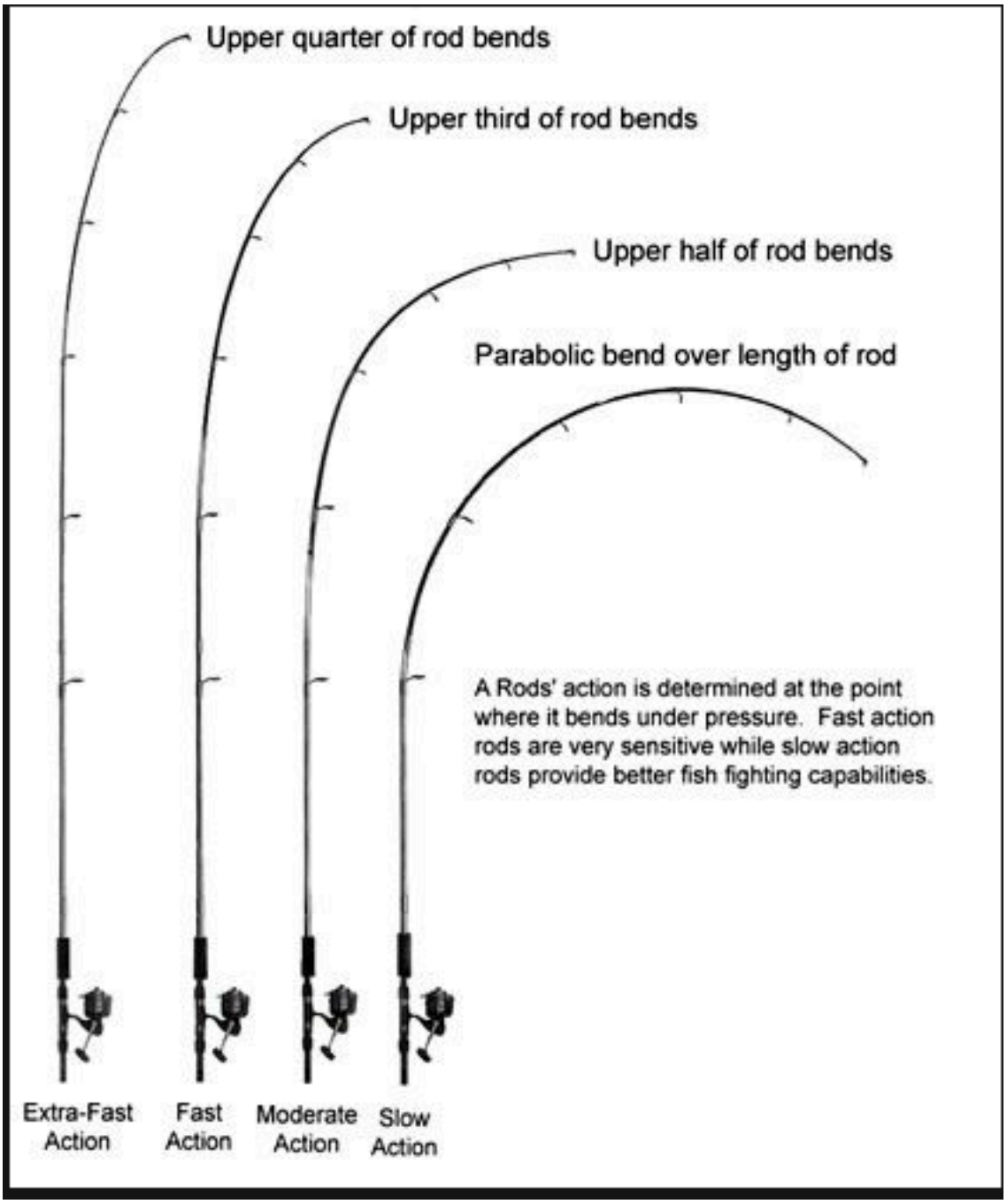
- Can we use one production type tracking system for both rods and lures ? How would that work, what would be needed in the data domain and UI's, along with the business process?

General Fishing Rod Breakdown:



Rods come in different lengths, with different actions:

Actions:



Codes: E F M S

Quality Sheet revision 2.0

Batch Information

Batch Date: 04/16/19

Production Line: 1 **Shift**: 2 **Run:** 1

BatchID: 190416-2.1

Batch Qty: 25

Model: BR0906E

Action: E

Rod Piece(s): 2

Good Units: 20 **Units with Defects:** 5

Defect Breakdown

Unit #	Defect Code	Severity	Zone (if applicable)	Comments
1	B3	L	B	Slight scratches near the bottom of the blank
2	B3	L	M	
2	G5	M	B	1st Guide out of alignment
3	B3	H	M	Gash across the middle, the graphite has been cut through
4	P1	S		Wrong spec, this blank fits MH spec, save for later.
5	B2	M	T,M,B	Paint has blotches throughout, needs sanding an re-painting/touching up.
5	R3	L		Was able to buff out scratch

Notes on Quality Sheet:

Batch Date may not be the date the quality check is performed. As an example units produced on 2nd shift Monday may not be checked until Tuesday morning. Most of the time we can check each rod as it is completed, but not always.

A production line could have multiple batch runs per day

We have an action test machine to very the rod action falls within spec

We have standardized the defect codes to the starting letter being meaningful:

B – Rod Blank

P – Performance (Action)

G – Guide related

R – Reel set related

Here are the codes we have so far: Sometimes we forget them and just write in the comment section because we have no way of reporting on defect codes and severity

DEFECT CODES

B1	Wrong Length	B2	Bad Paint
B3	Scratched/Chipped Blank	B4	Epoxy overage
P1	Out of Spec for Action	P2	Ferrules do not work correctly
G1	Wrong guides for model	G2	Chipped/Scratched
G3	Epoxy over/underage	G4	Bad wrap
G5	One or more guides not in aligned	R1	Crooked
R2	Does not operate correctly	R3	Chipped/Scratched
R4	Wrong Reel Set for model		

Severity Codes

L	Minor defect, can be fixed during quality check
M	Moderate defect, can be fixed in production
H	Severe defect, unit must be scrapped
S	Special, rod is good, put it in Finished Good inventory for correct spec

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CREDIT REQUEST FORM

Name: _____

Address: _____

_____

_____

_____

Phone: _____

Email: _____

Return Authorization Code: _____

Today's Date: _____

Date Purchased _____

Model: _____

Reason for returning: _____

_____

_____

_____

_____

Signature: _____