

Project Overview

PSI Control Solutions needs a system to maintain "shop parts" including nuts, bolts and washers. By redesigning the storage devices, and implementing a process for ordering, receiving and storing, PSI Control Solutions can maximize return on investment, while minimizing chances for stock-outs.



Inventory Control Model

- Automated Excel Sheet
- Usages for shop parts
- Quantities to be ordered
- Reorder point
- Safety Stock Levels

Part Number	Part Name	Part Description	Vendor	TYPE	Lead Time	Average Annual Demand	Average Monthly Demand	Price	Order Size	Reorder Point	Safety Stock	Bin Qty	Setting Stock
0000-0008	Fastener 32352	10-32 x 3/16" Self Drilling	Fastener Superstore	SCREW	3	2750	229	\$0.08	2500	302	\$4,657.33	3000	76
0000-0041	McMaster 90275A029	3/8" x 1/2" Self Drilling Washer Head Bolt Zinc	McMaster-Carr	SCREW	1	2740	228	\$0.03	500	57	\$1,454.50	500	51
0000-0202	McMaster 90275A029	3/8" x 1/2" Self Drilling Washer Head Bolt Zinc	McMaster-Carr	SCREW	1	3042.5	254	\$0.06	500	57	\$1,454.50	500	51
0000-0272	McMaster 90275A029	3/8" x 1/2" Self Drilling Washer Head Bolt Zinc	McMaster-Carr	SCREW	1	1010	84	\$0.02	250	19	\$476.69	250	19
0000-0288	McMaster 992A030	3/8" x 1/2" Self Drilling Washer Head Bolt Zinc	Fastener Superstore	SCREW	3	1051	88	\$0.02	2000	141	\$427.88	2000	49
0000-0289	McMaster 992A030	3/8" x 1/2" Self Drilling Washer Head Bolt Zinc	Fastener Superstore	SCREW	3	1051	88	\$0.02	2000	141	\$427.88	2000	49
0000-0289	McMaster 992A030	3/8" x 1/2" Self Drilling Washer Head Bolt Zinc	McMaster-Carr	SCREW	1	1052	87	\$0.03	900	61	\$493.56	900	22
0000-0289	McMaster 992A030	3/8" x 1/2" Self Drilling Washer Head Bolt Zinc	Fastener Superstore	SCREW	3	1000	83	\$0.01	4000	529	\$86.80	2000	44

Months	Fastenal Company - KY	McMaster 90064A430	McMaster-Carr	Fastener Superstore	Fastener Superstore	McMaster-Carr	Fastener Superstore
1	1500.00	6700.00	2010.00	1335.00	1125.25	1100	833.33
2	1500.00	1914.25	1000.00	1335.00	1125.25	1100	833.33
3	2000.00	1914.25	1000.00	1335.00	1125.25	3000.00	833.33
4	3500.00	1914.25	2000.00	1335.00	1125.25	750.25	833.33
5	1000.00	1914.25	1000.00	1335.00	1125.25	750.25	833.33
6	2000.00	1914.25	1000.00	800.00	1125.25	750.25	833.33
7	2000.00	1914.25	1000.00	800.00	1125.25	750.25	833.33
8	2000.00	1914.25	1000.00	800.00	1125.25	600.20	833.33
9	3500.00	1914.25	1000.00	800.00	1125.25	800.20	833.33
10	4000.00	1914.25	1000.00	1343.33	1125.25	800.20	833.33
11	4000.00	1914.25	1000.00	1343.33	1125.25	800.20	833.33
12	3000.00	1914.25	800.00	800.00	1125.25	800.20	833.33
13	4000.00	1914.25	800.00	800.00	1125.25	1000.00	833.33
14	1000.00	1914.25	800.00	800.00	1125.25	1000.00	833.33
15	2500.00	1914.25	1000.00	800.00	1125.25	1000.00	833.33
16	1000.00	1914.25	1000.00	1001.25	1125.25	750.00	833.33
17	2000.00	1914.25	1000.00	1001.25	1125.25	750.00	833.33
18	2500.00	1914.25	1000.00	1001.25	1125.25	750.00	833.33
19	1500.00	1333.33	1000.00	1001.25	1125.25	750.00	833.33
20	500.00	1333.33	2000.00	1001.25	1125.25	1000.00	833.33
21	2000.00	1333.33	1000.00	1001.25	1125.25	1000.00	833.33
22	4000.00	1333.33	1000.00	1001.25	1125.25	1000.00	833.33
23	1000.00	1333.33	1002.50	1001.25	1125.25	1500.50	833.33
24	1000.00	1333.33	1002.50	1335.00	1125.25	1500.50	833.33
Sample STD	1102.31	1029.00	379.18	216.03	0.00	563.06	0.00
Sample Mean	2292.50	1968.45	1128.13	1000.93	1125.25	876.21	833.33
Mean Lead Time	3.00	1.00	3.00	1.00	1.00	3.00	3.00
Order Size	4105.64	3678.44	1751.73	1396.16	1126.89	1806.59	834.98
Price	0.09	0.03	0.06	0.02	0.02	0.01	0.01
EOQ	2091.00	3447.88	1791.71	3002.45	3077.05	2074.33	4072.31
Order Instances	7.3	5	20	5	8	11	2
Quantity Ordered	55020	54900	24085	24020	22592	21004	20000
Average order size	784	10980	1204	4804	2813	1808	10000
Average of Above Data	2311	5019	1469	2541	2036	1667	3936

Order Quantity = (((Sample Mean) + (Normal Distribution prediction) + (EOQ) + (Average Order per size per instance)) / 4)

Sample Mean = Average of the 24 months

Normal Distribution prediction = Norm.Inv(0.95, Sample Mean, Sample STD)

EOQ = SQRT([2(Fixed Cost)(Annual Demand)] / holding costs)

Average Order per size per instance = (Total Ordered / Instances)

System Criteria and Customer Priority

- | | |
|-----------------------------------|-------|
| 1. Autonomous | 21% |
| 2. Productivity | 30% |
| 3. Ease of Use | 14.9% |
| 4. Ongoing Cost | 12.6% |
| 5. Implementation Timeline | 6.3% |
| 6. Implementation Level of Effort | 3.2% |
| 7. Initial cost | 2.9% |
| 8. Scalability | 3.09 |
| 9. Data Analytics | 5.4% |

Scanning Software Features



Scan

- Allows unlimited amount of barcodes to be scanned

Transfer

- Allows for purchase orders to automatically generate given what is scanned.

Email

- Creates a table of what is scanned, and automatically generates an email ready to send via Outlook

Bin Assignment and Verification by Volume



- Large** Volume: 306 in²
- Medium** Volume: 288 in²
- Small** Volume: 144 in²

Volume of Cylinder Part x Order Size Recommended <= Bin Volume

Volume	Total Volume	Order size	Order size*Volume	Maximum order size	Bin Size	Bin Volume	%
0.011	0.027	2500	66.931	11430	Large	306.000	22%
0.014	0.034	5000	172.428	8873	Large	306.000	56%
0.014	0.029	1000	28.695	5018	Small	144.000	20%
0.000	0.005	3000	16.099	26835	Small	144.000	11%

- The demand at which the individual items are used and part size will determine how many of the items are placed in the bins.
- Assume all parts are cylinder in shape to calculate the volume

2 Bin KanBan Design

This is designed to signal workers to reorder, while still having parts in stock. This lowers the chances of stock-outs. The workers pull from one bin until it is empty, and then they switch to the second bin while at the same time placing an order to replenish the items in the first bin.



Ordering Process

- Purchase orders are automatically generated after a bin is scanned
- Each order is organized by vendor, contact information.
- The PO number is created with the date, and number of orders.
- Prices, and assigned vendor for each part was determined from historical data

PSI Control Solutions, Inc
3900 Twin Lakes Parkway
Charlotte, NC 28269
United States

Phone: (704) 596-5617

PO Number: 20211112 Purchase Order DATE: 10/19/2021

VENDOR	SHIP TO
Fastener Superstore P.O. Box 694 Downers Grove, IL 60595 Supplier ID: 03085	PSI Control Solutions - Charlotte 6906 Twin Lakes Parkway Charlotte, NC 28269 United States

Change Order

PART NUMBER	PART NAME	QTY	UNIT PRICE	EXT PRICE	
3	McMaster	2500	0.02	44.41	
4	McMaster	2000	0.02	38.02	
				TOTAL	\$ 82.44

Comments or Special Instructions

Remit to:
Email: invoices to pagabab@psicontrolsolutions.com
if mailing, mail to: PSI Control Solutions
PO Box 2287
Cornelius, NC 28001

Operations and Implementation

An operations manual detailing the system has been drafted for seamless hand-over, and implementation of the proposed system. Contents for the manual include: Introduction, Concept of Operations, Inventory List, Inventory Analysis, Two-Kan-Ban Design, Storage Organization, Wireless Scanner, Ordering, Installing New Part, Setting up Email, Capturing Historical Data, Maintenance, Conclusions and References.

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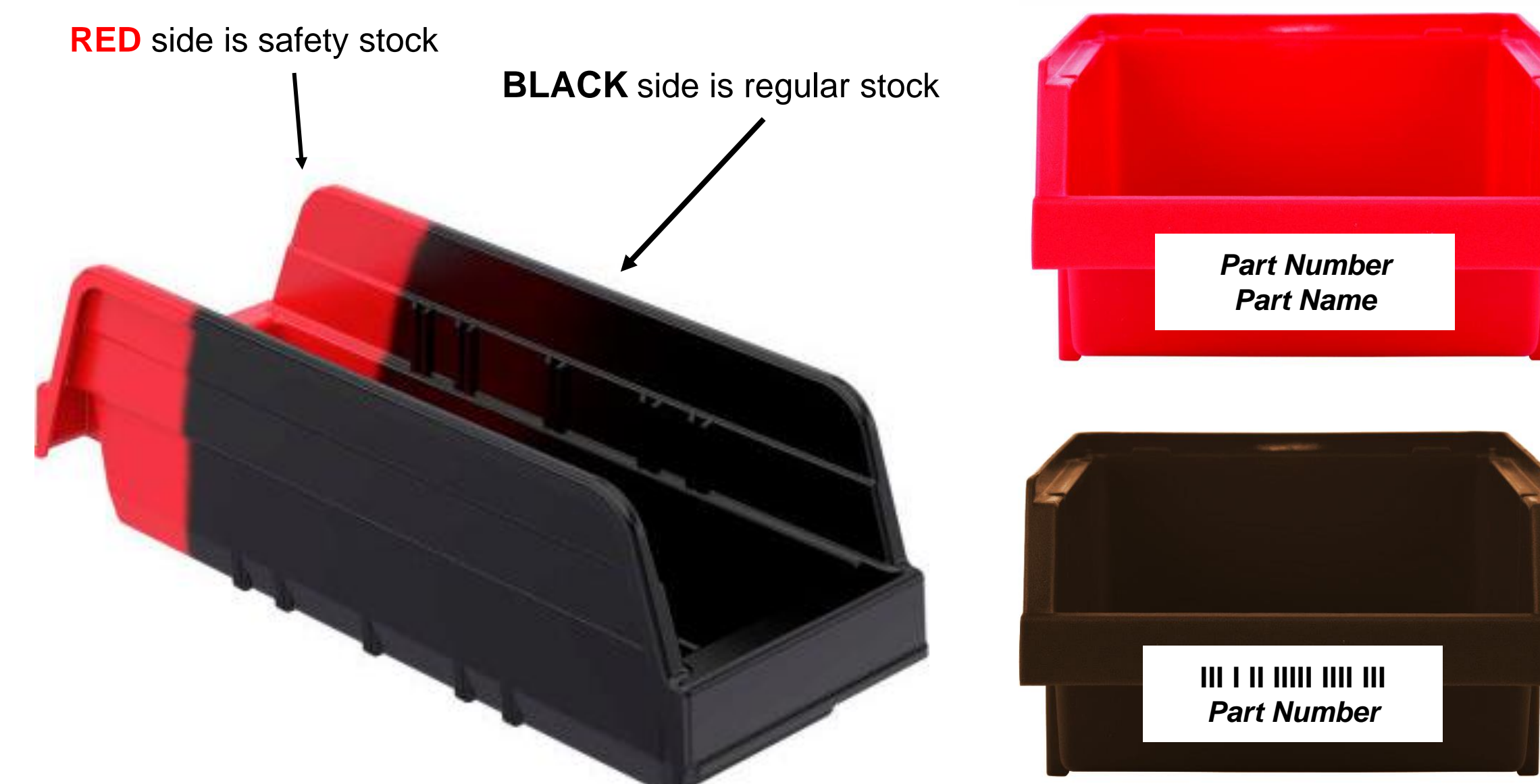


System Criteria and Customer Priority

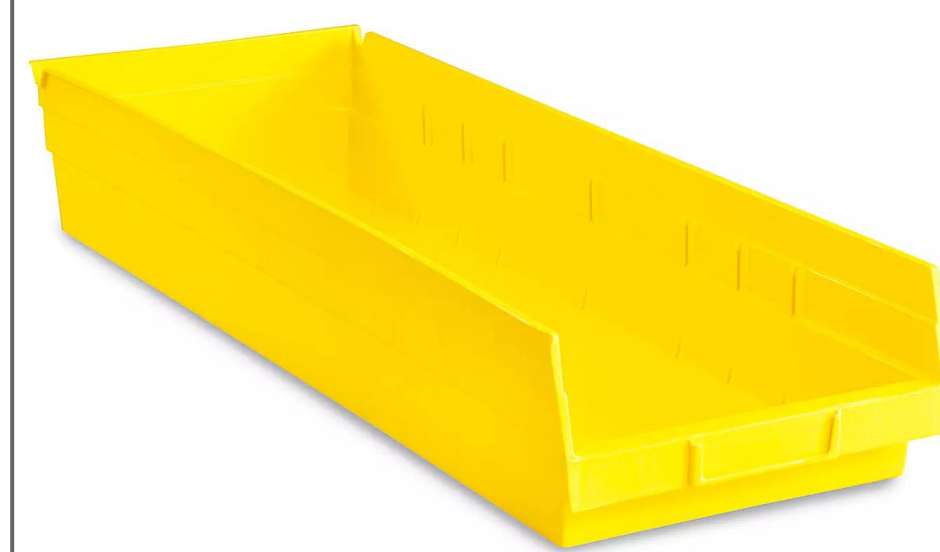
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3. Ease of Use	14.9%
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