

A Comparison of System Uptime Vs Availability

Overview

Astute prospective owners of automated material handling systems are quite interested in how much utility they will enjoy from their investment. This paper discusses a more practical metric for utility beyond the traditional measurement of mathematical “system uptime”.

Why Not Perfect?

Automated material handling systems are bespoke; custom made for their intended owner and application. Oh, they may be comprised of “standard” catalog products such as conveyors, AS/RS, software and the like, but there are rarely any two identical systems. Typically, there are many hours of application engineering that go into the data analysis, sizing, layout and design of such systems. Likewise, the equipment is usually manufactured in a batch mode rather than in a continuous, unvarying assembly line like auto manufacturers use. Lastly, integrated automated systems handle unpredictable material and are operated and maintained by unpredictable people.

All that combined means that such systems are inherently less than 100% flawless in their operation. Integrators will usually commit to uptimes of 98+% but never 100%.

Inevitably, a prospective user, usually a manager in the Operations team will scratch out the math and, looking at the poor sales person, say, “You mean to tell me that this expensive system will be down 9.6 minutes every 8 hour shift?!?!...my fork trucks almost never go down.”

In reality, the total system utility is much higher, but due to the above nature of such systems, elements or subsystems will suffer periodic and brief downtime that usually have minimal impact on the overall function of the total system.

A Useful Measurement

A more useful metric when comparing automation to conventional manual alternatives is *availability* of the respective asset, not how continuously it operates, aka *uptime*. For example, automated systems, when fully tested and properly operated...

- Start work instantly
- Don't take breaks
- Don't make mistakes
- Don't stop for lunch
- Are willing to work without supervision after hours
- Aren't any less productive in cold environments
- Usually don't need their batteries changed

HK Planet Problems and Solutions

So, let's compare the availability of a small automated material handling system, say pallet handling AS/RS, and a comparable manual fork truck system.

A Comparison of Asset Availability

Activity	Ambient Manual	Freezer Manual	Automated
Hours in a shift	8	8	8
Minutes	480	480	480
Time to go from time clock to duty	4	4	
Logging in, prep, driving to storage	5	5	
Morning break	10	10	
Lunch	30	30	
Afternoon break	10	10	
Correcting for 1% error in handling	12	12	
Battery changing	20	20	
Logging off, cleanup, driving to equipment room	5	5	
Time to go to time clock	4	4	
Equipment and/or product related downtime	0	0	9.6
Warm up time (15 min per non-break hour)		75	
Total Unavailable Time	100	175	9.6
Availability	79%	64%	98%

Thus, a pragmatic measure of the utility of your asset, be it manual or automated, is availability; how often the asset will actually be doing work for me.