Robotics In The Food Industry
Processing & Packaging

3A Sanitary Standards Institute Annual Meeting

Bob Rochelle

Stäubli Corporation




Robotics In The Food Industry

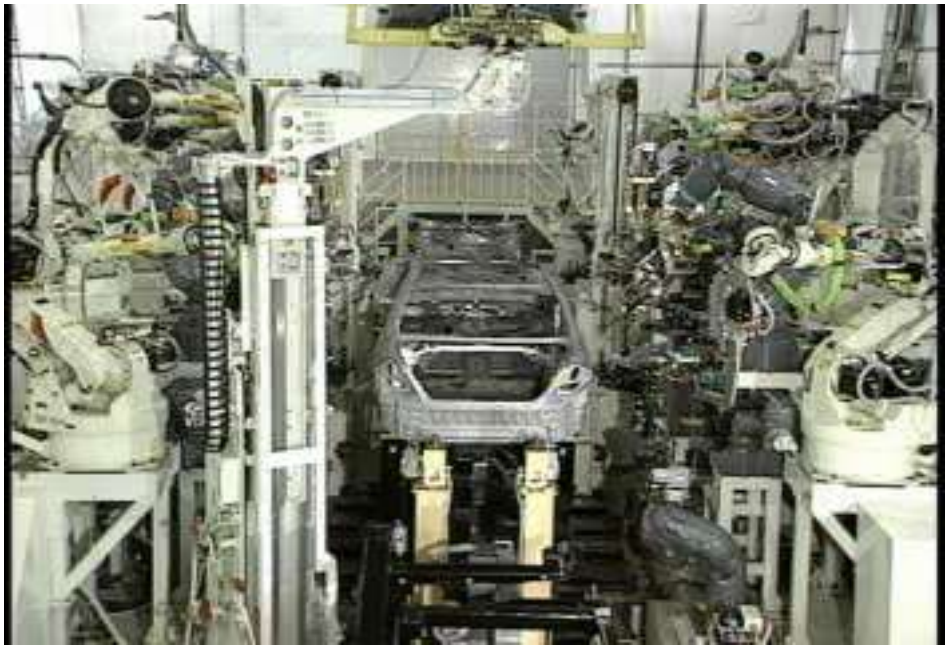
- ***What is Robotics?***
- ***The Robotics Industry***
- ***The Business Case for Robotics***
- ***Food Industry Requirements and Applications***
- ***The Draft 3A Standard***

Robotics = Flexible Automation

- ***Manual***
  - *Fast product change*
  - *Breaks*
  - *Monotonous tasks*
  - *Health claims*
  - *Labor issues*
  - *Training*
- ***Dedicated Automation***
  - *High volume*
  - *Requires set-up time*
  - *More maintenance*
  - *Air cylinders / actuators*
  - *Rigid conveyors / fixtures*
- ***Flexible Automation***
  - *Quick product change*
  - *Programmable*
  - *Repeatable*
  - *Changeable cell configuration*
  - *Responds to part changes*

Robotics Industry

- ***History***
  - *1956 – Development began*
  - *1961 – First installation*
- ***Over 1,000,000 at work today***
- ***Over 200,000 sold per year***
- ***Yearly Industry Revenue***
  - *$5,000,000,000 - robots*
  - *$15,000,000,000 - systems*
- ***Growth rate average 18% yearly***
  - *Except 2008 / 2009 / 2010*
  - *Very Strong 2012 and 2013*
    - *Outside of Automotive*
- ***Largest Industry and Markets***
  - *Automotive - 47%*
  - *Electronic -15%*
- ***Major Applications***
  - *Material Handling - 39%*
  - *Welding - 30%*



ROBOTIC INDUSTRIES ASSOCIATION

www.robotics.org

Buy a Robot and Save America

- ***Article in Forbes Magazine "Buy a Robot and Save America"***
  - *Average wage for an unskilled worker is $15 - $20 per hour plus benefits*
  - *Average UAW wage for unskilled trades is $30 - $35 per hour plus benefits*
  - *Average wage for similar labor in China is $3 per hour plus benefits(?).*
    - *Offshore Manufacturing Risks and Issues*
      - *Higher transportation costs and more problems*
      - *Longer delivery times*
      - *Quality problems*
      - *International concerns like terrorism*
      - *Loss of real-time control of manufacturing*
      - *Loss of ability to make quick product or process changes*
      - *Loss of closeness to your market and your end-customers*
  - *A robot works 24 / 7 / 365 without breaks, benefits and legacy costs etc…..*

Buy a Robot and Save America

- ***2 shifts per Day Material Handling for 20 Years (80,000 hours)***
  - ***30 Kg Size – 5.4 kVA rating***
    - *Electric rates 0.11 KwH = 0.594 cents per hour*
  - ***Maintenance Costs for 80,000 hours***
    - *10,000 hour Lubrication – Lube 8 times*
      - *Year 3 , 6 and 9 about $500 in lubrication costs*
    - *8 – 10 Years expect some form of unscheduled maintenance*
      - *$5,000 from typical service life cycle costs*
    - *Well after 10 years refurbishment may be required*
      - *Typical cost for full refurbishment - $10,000*

Do The Math

- ***2 shifts / day for 20 Years***
  - *Rebuild once in 20 years……..$10,000*
  - *Maintenance for 20 years…….…….$13,000*
    - *Lubrication……..…...$3,000*
    - *Unscheduled repairs…...$10,000*
  - *Power 0.59 x 80,000 hours…….…...$47,200*
  - *Total ……..…* ***$70,200***

- ***OR do it Manually.***
  - *80,000 hours x $30.00…….* ***$2,400,000***

- ***Savings…….. $2,329,800***

Buy a Robot and Save America

- ***Back to the Article in Forbes Magazine "Buy a Robot and Save America"***
  - *Average wage for an unskilled worker is $15 - $20 per hour plus benefits*
  - *Average UAW wage for unskilled trades is $30 - $35 per hour plus benefits*
  - *Average wage for similar labor in China is $3 per hour plus benefits(?).*
  - *Average wage for a robot is under $1 per hour with no benefits.*

THIS IS THE BUSINESS CASE FOR ROBOTICS!

Why Automate?

- ***Reasons for Automating Processes***
  - *Need to reduce direct labor*
  - *Can't get people to do the job*
  - *Need to increase quality*
  - *Difficult to do the job manually*
  - *Need to increase production*
  - *Difficult to meet specifications consistently*
  - *Need to provide flexibility in processes*
  - *Hazardous to personnel*

  - *Eliminates a contamination source*

The Food Industry

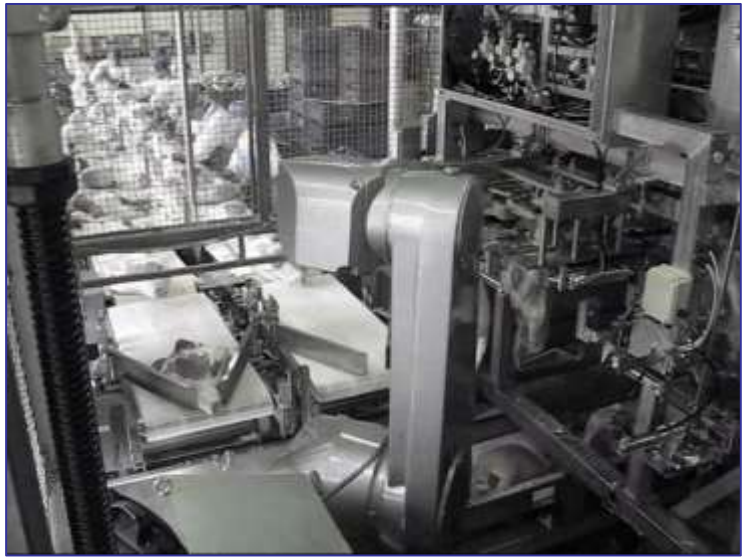
- ***Traditional Applications – Mostly Packaging Areas***
  - *Palletizing*
  - *Secondary Packaging*
    - *Case packing / carton loading*
  - *Primary Packaging*
    - *Dependent upon the products*
- ***Current and New Applications***
  - *Handling raw or unpackaged food products*
    - *Primary Packaging*
    - *Processing*
  - *Requires wash down, clean systems*
  - *Resistant to corrosion*
  - *Resistant to water damage*
- ***Warehouse***

Food Robot System Requirements

- ***Any Robotic Automation System Specifications***
  - *Reach / Payload / Speed / Inertia*
- ***Protection from Water and Humidity***
  - *Sealed Design with Smooth Finish for Drainage*
    - *Higher IP Rating is more protection*
      - *But not necessarily 'clean'*
    - *Protected from water with sealed covers*
      - *Motors and 'electronics'*
  - *Corrosion resistant coating*
  - *Purged to prevent water entry and damage*
  - *Cabling protected from water*
  - *Locate Controls away from water damage*
- ***Covers***
  - *Condensation inside creates corrosion*
  - *Leaks when damaged or installed incorrectly*

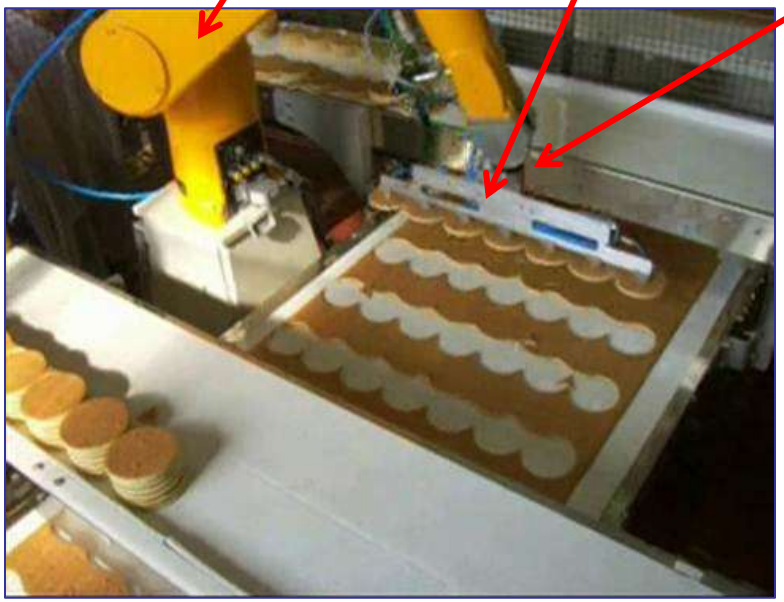
Food Products

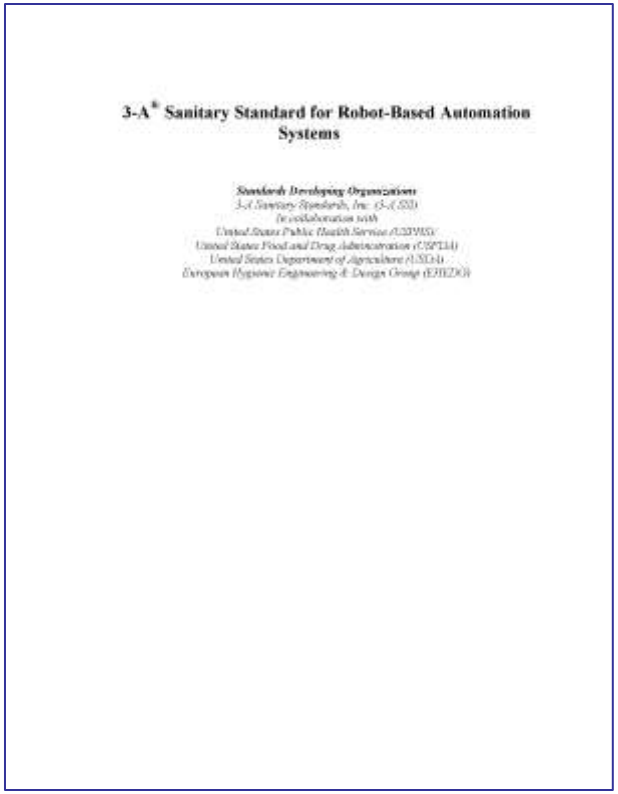
- ***Secondary Packaging***
  - *Bread Loaves Packaging*
  - *Packaged Egg Rolls into Display Boxes*
- ***Primary Packaging***
  - *Sausages into trays*
  - *Bulk Pastries into cases*
  - *Stacking Hamburgers*
- ***Processing***
  - *Handling Whole Chickens*
  - *Stirring Cheese Curds*
  - *Tending a Cheese Slicer*
  - *Ham De-boning*
  - *Bread Scoring*



3A (Draft) Standard Highlights

- ***Pertinent to Robot Arm, End of Arm Tooling and Tool Changer only***
  - *Other system components 'covered' in other 3A standards*



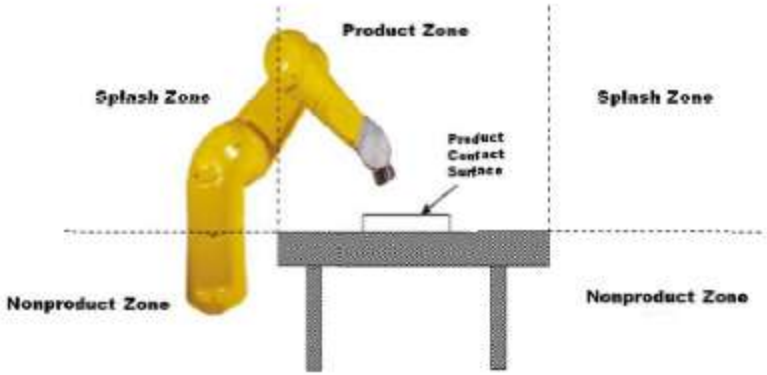


3-A® Sanitary Standard for Robot-Based Automation Systems

Standards Developing Organizations

3A (Draft) Standard Highlights

- ***Pertinent to Robot Arm, End of Arm Tooling and Tool Changer only***
  - *Other system components 'covered' in other 3A standards*
- ***Requirements***
  - *Postures to promote draining away from the Product Zone*
  - *Home position in a posture that promotes draining and is not over the Product Zone*
  - *Only in the Product Zone when performing work*
  - *Sealed, Cleanable Design with Smooth Finish for Drainage*
    - *Positive air pressure 'on' during cleaning and operation*
  - *Tooling must be removed for cleaning*
    - *Tool Changer or manually*
  - *Tooling is Product Contact*
  - *Locate Controls away from water damage*



Summary

- ***Robotics is an applicable technology for Food Processing applications***
  - *Your competitors are automating*
- ***The Food Processing Industry needs a leader in adopting this technology***
  - *The food industry is a recognized growth market for industrial robotics*
  - *'The window of opportunity' is open for the 3A SSI right now*
- ***Robot based automation is a mature, proven technology in many industries***
  - *It is 'relatively' new to the food processing industry*
  - *Throughout history resistance to new technology is common*
    - *Trains, automobiles, air travel, telephone, fax, email, internet, social media etc….*

Thank You

Bob Rochelle

Food & Packaging Industry Specialist

STÄUBLI
FAST MOVING TECHNOLOGY

201 Parkway West
Duncan, SC 29334
USA

(248) 924-6206
b.rochelle@staubli.com

www.staublirobotics.com