

In a conversation with this reporter, Anderson said that Samuels did not have much to say about the waterfall-prototyping controversy, but she did state that she would give her 'eye teeth' to have Samuels exonerated.

"The project was doomed long before Samuels misinterpreted those formulas", Anderson stated emphatically, in the living room of her suburban townhouse.

In her conversation with this reporter, Anderson did her best to explain the waterfall-prototyping controversy in lay terms. "The main issue was really whether we could agree on the system requirements without allowing actual robot operators to get a feel for what we had in mind. Reynolds has been in the data processing business for three decades and he's good at that, but he never should have been made manager of this project." According to records obtained by the Sentinel-Observer, Silicon Techtronics moved Sam Reynolds from the Data Processing Division, which took care of inventory and payroll, to the Robotics Division just three weeks before the December 11th meeting alluded to in Anderson's memo.

Reynolds was moved to the Robotics Division by Silicon Techtronics president Michael Waterson. Reynolds was replacing John Cramer, who managed the earlier Robbie projects, CX10 and CX20. Cramer was placed in charge of CX30, but he died unexpectedly in a sky-diving accident. In placing Reynolds in charge of the CX30 project, our sources tell us that Waterson was going against the advice of Ray Johnson, Robotics Division Chief.

According to these sources Johnson strongly opposed Reynold's choice as head of the Robbie CX30 project. These sources tell the Sentinel-Observer that Waterson's choice of Reynold's was purely a cost-saving decision. It was cheaper to move Reynolds to the Robotics Division than to hire a new project leader from outside the corporation.

The anonymous source that the Sentinel-Observer calls 'Martha' described the situation in this way: "Waterson thought it would be cheaper to move Reynolds to robotics rather than try to find a new manager for the Robbie project from outside. Also, Waterson tended to be suspicious of people from the outside. He often sends down memos about how long it takes people to master 'the Silicon Techtronics way of doing things'. In Waterson's view, Reynolds was a manager and he was moved to his new position in Robotics as a manager and not as a technical expert. Clearly, Reynolds saw himself as both a manager and as a technical expert. Reynolds was not aware of his own technical limitations."

According to Martha, Reynolds was very reluctant to manage a project which would not use the waterfall model which had served him so well in data processing. He attached prototyping as a "fad" at the meeting on December 11th and after a few verbal exchanges back and forth things got pretty personal. "Anderson was especially vocal", Martha recalled. "She had lots of experience with user interfaces and from her perspective, the operator-robot interface was critical to the success of CX30 since operator intervention would be frequent and at times critical."

In her interview with the Sentinel-Observer, Jan Anderson commented on this aspect of the December 11th meeting: "Reynolds was vehemently opposed to 'wasting time' - to use his words - on any kind of formal analysis of the user interface and its human factors properties. To him, user interfaces were a peripheral issue."

"Anything new was a 'fad' to him [Reynolds]", Anderson added. "Computer interfaces were a fad, object-oriented design was a fad, formal specification and verification techniques were a fad, and most of all, prototyping was a fad."

Exactly one week after the December 11th meeting, the Robbie group received a memo from Sam Reynolds concerning the project plan for the Robbie CX30 project.

"It was the waterfall model, right out of a textbook", Anderson told this reporter as she reviewed a copy of the project plan memo. "Requirements analysis and specification, then architectural design and detailed design, coding, testing, delivery and maintenance. In Reynold's view of things, there was no need to have any user interaction with the system until very, very late in the process."

The Sentinel-Observer has learned that the very first operator to actually use the Robbie CX30 robot in an industrial setting was Bart Matthews, the man who was killed in the killer robot tragedy. This initial use of Robbie CX30 in an industrial setting was covered by the media, including this newspaper. In a great irony, the Silicon Techtronics Annual Report for Shareholders, published last March, has a picture of a smiling Bart Matthews on its glossy front cover. Matthews is shown operating the very same Robbie CX30 robot which crushed him to death barely two months after the photograph was taken.

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THE 'KILLER ROBOT' INTERFACE

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Abstract: The Robbie CX30 industrial robot was supposed to set a new standard for industrial robot intelligence. Unfortunately, one of the first Robbie CX30 robots killed an assembly line worker, leading to the indictment of one of the robot's software developers, Randy Samuels. This paper propounds the theory that it was the operator-robot interface designer who should be on trial in this case. The Robbie CX30 robot violates nearly every rule of interface design. This paper focuses on how the Robbie CX30 interface violated every one of Shneiderman's "Eight Golden Rules".

1. Introduction

On May 17, 1992 a Silicon Techtronics Robbie CX30 industrial robot killed its operator, Bart Matthews, at Cybernetics, Inc., in Silicon Heights, a suburb of Silicon Valley. An investigation into the cause of the accident led authorities to the conclusion that a software module, written and developed by Randy Samuels, a Silicon Techtronics programmer, was responsible for the erratic and violent robot behavior which in turn lead to the death by decapitation of Bart Matthews1.

As an expert in the area of user interfaces (1,2,3), I was asked to help police reconstruct the accident. In order to accomplish this, Silicon Techtronics was asked to provide me with a Robbie CX30 simulator which included the complete robot operator console. This allowed me to investigate the robot's behavior without actually risking serious harm. Due to my