

# FROM ATOMS TO ZIPPERS

By Ricardo Hadis, P.I.I. student 1967/68

“Time will fly so fast in your life, you will hardly realize how it was gone” Dr Ir Albert van Weel, former Director of PII

“From the Economic Development point of view, there clearly exist 4 types of countries, namely,

- the developed countries
- the developing countries
- Japan, which has so few resources nobody understands how it is so developed, and
- Argentina, which has so many resources nobody understands why it is not developed”  
Jeffrey Sachs, MIT Economist.

Thank you, Marjo, for being with us today. You are the glue and the spirit of P.I.I. all in one person, and so dear to all of us.

My tribute goes to the memory of Dr van Weel, who had so much patience with me, and to Dr Scholten for his tutorship and dedication.

My memories go to our companions who passed away, to our memorable summer outings with Assad dayed to the swimming pool, to the remarkable mischiefs of Fernando Martinez Penacoba, to the incredible efforts of Fernando Obregon to learn English, and to David Heller’s super long driving which took us to almost every corner of Europe.

Since I left PII I met with Mr & Mrs Eduardo Mariscal Hay, Mr & Mrs Cho Lun Wond (and their daughter Kay), Mr & Mrs Benjamin Kuchen, Shaukat Mahmood El Chadri and his entire family, and Jose Coelho Ramos and family. In some cases, for several times. The joy has been huge, and luckily it continues.

I bring you a special greeting from Benjamin Kuchen, who could not make it. As the top man in charge of the University of San Juan in Argentina, he has a very demanding agenda. Besides, he is so popular he will no doubt be reelected, but this being his 3<sup>rd</sup> tem, he decided to put an end to it next year.

Just after PII, and because of my graduate course at PII, I was hired by the National Atomic Energy Commission (NAEC), then “owned” by the Argentine Navy. I was assigned to a group that developed instruments for nuclear reactors. This is the electronic part of my career so it may be worth going into some detail.

The assignment I most enjoyed was a temperature stabilized single channel analyzer using integrated circuits. In those times, the fastest ICs used TTL (transistor-transistor-logic), which output “1” voltage is very temperature dependent. The logic “1” pulses loaded several passive

diode-R-C or “pump” circuits that convert pulse rate to an analog voltage. Several pump circuits, covering the whole rate ranges of interest were operationally added and amplified, giving an analog count of the number of pulses. I solved the temperature stabilization in a twisted way; I made the TTL IC power supply voltage to be temperature dependent. The single channel delivered accurate pulse rate readings in the 0 to 50 degrees C range. My article was published in “Nuclear Instruments and Methods”, a monthly magazine for the world atomic energy research community, published in... the Netherlands. I received numerous requests for reprints from research scientists all over the world.

By the mid 70s I switched from a mostly scientific job to an industrial management position. I saw more opportunities at the private industry than at my government position, so I accepted a proposal to put my talent to contribute to the technology of making zippers.

Zipper making is both a precision and a labor intensive industry. Most of my technical efforts at that factory were directed at saving labor while improving the quality and lowering manufacturing costs. There were many grotesque situations with the trade unions, empowered by the political system to unbelievable excesses (e.g. the story of the ladies’ hair shop inside the dressing room).

There are basically three types of zipper chains, the teeth made respectively of a stamped non-ferrous metal, or of coiled polyester monofilament, or of injected plastic resin. It may surprise you to learn that the consumption in developed countries is 8 to 14 meter/person.year, and in a developing countries it is about 3 to 6 meter/person.year. The articles that use zippers are not just clothing, but also luggage, upholstery covers, mattress covers, ladies’ bags. And lately they are also used in construction, in surgery, etc etc.

The first zippers had metal teeth, but were very different from today’s zippers. The inventor was Elias Howe who received a U.S. patent in 1851 for “an automatic, continuous clothing closure” but never put it into the market. Four decades later, another American named Judson was awarded another patent “Clasp Locker or Unlocker for Shoes” and in 1894 started the Universal Fastener Company. Many new patents and industrial processes made zippers a well known product.

After WWII the improvement of polymers gave rise to a variety of plastic zippers made with coils of plastic wires. The synthetic zippers are the most popular in the market. Since the melting point of polyester is above 200 °C, clothes with these zippers can be safely ironed.

In order to close or open a zipper, a slider is needed. They are made of stamped or injected non-ferrous metals or plastic to avoid rust. There is a lot of engineering in every slider model. The most elaborate models are self locking and have 5 components. They are automatically assembled by robot machines, which reject defective components.

One of the factory processes was to paint the sliders to match with the zipper’s color. I first changed the method of painting sliders from using a compressed air spraying gun to using an electrostatic spraying gun. It saved 70% of enamel. But there were still two dozen workers doing that job, most of them placing the sliders on pieces of carton, and after painting they had to take them out of the cartons.

After receiving technical support from our Danish associates I developed an automatic enamelling line, where no human hand would touch the sliders. These were automatically aligned and fed via

mechanical vibrators into several 30 meter long rails, then driven at constant speed by pulling aluminium/paper foil that also served both as a mechanical support and as the ground connection for the electrostatically charged paint. The paper was conveniently cut and discarded at the end of the line. Even before implementing it, it caused lots of quarrels with the trade union. But then there were some new paint formulas allowing to use barrel enamelling with a glossy appearance, and my machine never started to produce.

In the '70s, most of the innovations for making zippers came from Germany, Denmark, France and Italy. As part of my job, I travelled a lot and received many technical recommendations from many clever and friendly people in this industry.

I am a witness of how manufacturing shifted from Europe to Japan in the '70s, then to Taiwan in the '80s, and to China in the '90s. I believe that in the future, our sons and grandsons will see how manufacturing shifts to Africa.

By now, fully automatic assembly lines are available in Taiwan and in China, which are a copy of the first ones developed in Germany in the late '70s, but at a small fraction of the cost. Please pass along the samples, where each subsequent zipper shows another step of the automatic production line.

Around 1980 our economy was hardly pressed by very high interest rates, which carried on for enough years and destroyed most industrial companies in Argentina. Including the company I was working with.

I found myself jobless in 1980, with a family to feed, while all doors leading to a job were closed. I decided I knew enough about the zipper industry as to become a consultant to my former competitors, and to use all my foreign contacts to be a sales rep of their machinery and raw materials in my own country.

My new job was so welcomed, I was soon multiplying my income, working for myself. Now I keep looking for new fields for my business, and plan to be busy while my health allows.

I am a widower since 2003. It was indeed a very sad loss. On the other hand, thanks to the non-symmetry of the male female population distribution, it opened a whole new world for me, by then just under 60 years of age.

My late wife had opened my eyes to her fields of study, anthropology and archaeology, and encouraged me to learn more about the arts and design, history and social sciences. I feel very enriched by understanding the world from so many perspectives other than my technical education.

A Hindu proverb says that having sons or daughters is like throwing arrows with a bow into the future. My arrows have flown very far.

I guess all of you are proud of your own arrows. Mine have flows very far...

Martin, 39, studied computer science, and then got a Master in Artificial Intelligence from the MIT Media Laboratory, USA. He turned into being a writer, a literature lover, a linguist/phylogist

who speaks quite many languages and lately a strategic business consultant. You can see part of his work at [www.martinhadis.com](http://www.martinhadis.com) and [www.internetaleph.com](http://www.internetaleph.com)

Pablo, 37, also has a degree in computer science, then a Master in Fine Arts / Cinema from the Univ of California / San Diego, has turned into a computer animator, a software writer, a filmmaker and an internet journalist dedicated to computer animation. He is now starting a film production company. You can check his journal at [www.maxunderground.com](http://www.maxunderground.com)

Our friendship, gentlemen, started at a farm in Barchem in Sept 1967. May it last for many years to come. Thank you for your patience.

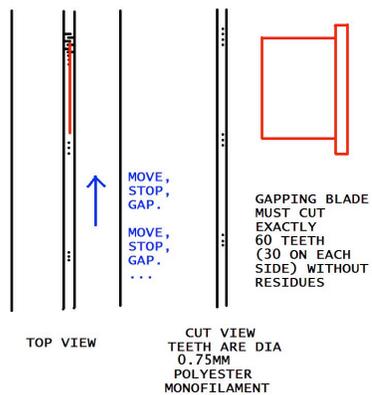


Figure 1. Design for Zipper Industry by Ricardo Hadis

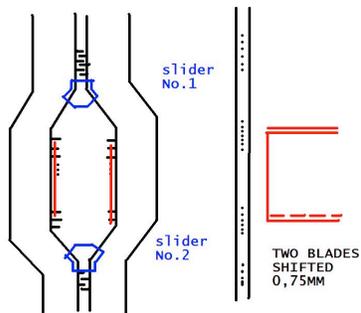


Figure 2. Design for Zipper Industry by Ricardo Hadis