



Changing lives in Ghana



Though one of the most developed and peaceful nations in Africa, the Republic of Ghana on the continent's western side still faces many challenges. Life in this emerging economy is still quite primitive, especially in rural areas where running water and electricity is a rarity. "It is hot, humid and the power supply is erratic on a good day," explains Jonathan Porter, who has lived in Ghana for two decades now.



A desire to make a difference in people's lives led Jonathan to Ghana in 1994. He worked with international aid organizations to solve problems related to trade and economics. Jonathan spent more than a decade doing so before changing course. "I realised over time that the 'hand-out' approach of international aid is not the answer to long term growth in our developing nations."

Jonathan's realization led him to leave international aid work and embark on a journey that today has him completing more jobs in a week than most will ever do in a lifetime. He flies aircraft, services engines, designs parts, treats wounds, provides health education, trains teachers, and runs a manufacturing facility where plasma is used. Put all that on a business card and it might say "Jonathan Porter: pilot, mechanic, engineer, nurse, teacher, manufacturer, and fabricator."



Jonathan's history with industrial cutting spans a few decades. Back in the 80's, he mostly used punch and laser cutting systems, pulling out plasma for the "thick stuff" as he describes it. The thick stuff was armoured plate for tanks which he cut out with a Messer® system. Jonathan remembers it this way, "The plasma machine bed was massive, about the size of a swimming pool, and the plasma head itself looked more like a medieval battering ram mounted vertically. It was not clean, nor fast, but it cut." In addition, Jonathan's system came with a "mini-computer," a word Jonathan calls relative, as the controllers of the time were actually rather large.

After moving to Ghana to 1994, Jonathan put his CNC work on hold. Looking back now, Jonathan says, "It was as if a part of my soul was missing. Manufacturing, and especially sheet metal fabrication, is special. I believe that every young person should be exposed to working with sheet metal!"

Jonathan's vision upon leaving international aid in 2005 was to build an integrated airfield, manufacturing facility, and museum. He started by bringing together like minded individuals. Before long, he witnessed the creation of a private airfield near Kpong, in Eastern Ghana.

"Thus I made the bush-lands my home, with the good, the bad and even the ugly." Jonathan soon found himself living off the grid while developing an aircraft build and maintenance facility, flight training school, health education clinic and children's learning centre.

With his new enterprise up and running, Jonathan and his team set about building an aircraft – a Zenith CH701 – from a kit. "All the sheet metal skills for building the Zenith CH701 aircraft we fly were those of the old school – snips, rivet guns, electric drills, lumps of wood, clamps, the 'arm-strong' methods of shaping 6061-T6 metal and the occasional 'stronger word', that always helps fit two chunks together!"

In 2013, Jonathan and team made the decision to expand the general engineering operations at the facility. The group believed expansion would ensure the solid cash flow needed to fund current programmes and create new opportunities to train and employ local people.

With the expansion, came the whispering of the "CNC sheet metal gods" as Jonathan calls it. Jonathan wanted to expand his fabrication operations but needed to choose the correct cutting process.

"I actually felt a bit like Goldilocks, knowing that we had three basic choices, but not really knowing which one would offer us the flexible sheet metal working solution we needed."

The three basic choices Jonathan considered were punch press, laser, and plasma. He dismissed the first two choices for a number of reasons including expense and power requirements. This left plasma.

"Despite my lasting memories of plasma being too big and making ugly cuts, I was thrilled to discover that it really was just right. It was the perfect porridge! It only needs compressed air, reasonable power requirements and consumables that can be changed cost effectively and rapidly."



With a cutting process selected, Jonathan now needed to find a table manufacturer. "We looked at lots of CNC machine providers before finally choosing to work with PlasmaCAM®. They had a CNC kit, I was certain we could modify to meet our needs. Best of all, the folks at PlasmaCAM were ready to spend time talking to me, and answering a thousand questions even if I was in Africa!"

Next up was the plasma unit. From his home base in Ghana, Jonathan took to the internet where he attempted to research various manufacturers. Attempted, is the key word here, as his task was made quite difficult by spotty internet connectivity.

"Using our very poor internet to research plasma system providers over mobile network modems was a challenge. Since we were in the bush, YouTube videos would load and then fail after ten seconds."

Frustrated, Jonathan gave up on videos and instead searched online discussion forums. "Repeatedly I came across this chap called Jim Colt. He obviously worked for Hypertherm®, but was even handed in his comments and proved help was available. He debunked the poor cut quality myth that I had in the back of my mind so all looked good."

Jonathan's next step was to reach out to people on the discussion forums who owned Hypertherm systems. "I spoke and exchanged emails with Hypertherm owners and could not find a dissatisfied customer."

Jonathan was sold on Hypertherm, and after consulting with PlasmaCAM, decided to buy a Powermax85®. Now he just had to wait. "The order was placed, and we waited for the machine to arrive. Our expectations were high. I was busy showing everyone snippets of video so they could see what plasma could do. I was told time and time again that 'plasma does not cut well in these parts!' The horror stories were many. Doubts started to eat away at my enthusiasm for our new machine, but as it was on the way, we were committed. Then it arrived. The Hypertherm packaging box was damaged in transit (most things are coming here), but the system seemed in order."

Jonathan got to work unboxing his new system. One of the first things he noted was the system's size. It was much smaller than the plasma he had used 30 years earlier. He worried it wouldn't perform as Hypertherm and PlasmaCAM had promised. Still he continued to connect everything, and before long was ready to cut. Unfortunately,

his feeling of excitement at getting to this point didn't last long, as Jonathan explains in his own words.

"The cuts were horrible. The dross was terrible. Our air compressor could not keep up with the machine. I went to bed sad, disappointed and despairing at the mistake I had made. The next day we went to Accra, our capital city, to find a bigger compressor. We found one that needed fixing and brought it home. Whilst we were repairing and installing it, I read the Hypertherm manual. For a technical manual, it is not very thick but it has lots of useful tables, if you take the time to read it! I changed some settings, connected the big red three phase compressor with a new water separator and fired up the machine. I had my doubts that cutting at just 45 amps at speeds of 130 millimetres per second would improve the outcome from the first trials, but I decided to follow the Hypertherm manual!"

"Like a pilgrim on the road of discovery, I heard an electrical ca-thump, a hiss of air and then saw a flash of searing bright, pure white light accompanied by streams of sparks, glowing red and orange, cascading beneath the sheet of steel. A few complimentary ones, bouncing off the surface, kissed my arm as the machine turned the corner, cutting the last joint to drop out the finished product! Turning the still hot piece over I was amazed at the cut. It was all but dross free. The quality was fantastic; better than imagined. Had I died and gone to plasma cutting heaven? Was this really a laser in disguise? I asked my wife, Patricia (she is probably the best welder, pilot and engineer in Ghana) to hit me on the head with a chunk of 2 inch angle iron to check if I was dreaming. Thankfully she declined. Impatiently, we cut another piece, and another, and another. We made all the things we could think of. It was our Hypertherm honeymoon period. This machine could cut amazingly and it never needed any attention provided you made sure the air supply was good and followed the settings provided in the manual!"

"One day, whilst cutting 5 millimetre plate, we had our first problem. There was a loud splurgle (sic), a sudden jarring of the Z-axis, and a spray of sparks that hit the ceiling. I hit the emergency stop button, my heart beating as if it were a V16 turbocharged engine about to explode from over-revving. What had we – okay I – done? I was certain that this Hypertherm plasma was about to cost us an arm and a leg. Gently we took the retaining cap off. It looked to me like we just needed a new electrode. Could that be





the only problem? Could our system really just need a new electrode? Gingerly, we changed the electrode and prayed to the plasma generators in the sky to bless our work. The PlasmaCAM® initialised, and after switching the Powermax® off and on again to clear an error, it went back to cutting like new. It really was just an electrode!"

"We had seen the light, we had seen the sparks. We had seen that our Hypertherm Powermax85 was a game changer. It has changed our lives forever! Seriously, and without exaggeration, it really has."



"Barely a day goes by without us using our Powermax. We use it to make steel racks, tables, chairs, blanking plates, gates, cutting jigs, benches, aircraft parts – even steel dinosaurs – on top of subcontract work. Right now we are producing parts for a new Learning and Discovery Centre for rural children to come and learn more about engineering and aviation."

"Without our machine we could not earn the funds to do what we do, or make the things that we make to change lives, making rural West Africa a better place; a place of inspiration and development. I can honestly say that our Hypertherm machine has changed what we can do, and how we do it. We cannot ever imagine being without this marvellous tool!"

Learn more about Jonathan and his work at www.waasps.com and www.medicineonthemove.org or email him at capt.yaw@gmail.com.

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