

Interview with Organization 2

This transcript has been anonymized to not have the organization 02 and the interviewees identity be known. Also any information regarding other companies that is not regarded of importance for this research has been deleted or anonymized.

Interviewer: Nienke van der Kooij [NK]

Interviewee: Tom Janssen [TJ]

01/12/2021, Microsoft Teams, 13.30

[NK]: So you got the interview protocol I send you I think?

[TJ]: Yep, I did.

[NK]: Did you have a chance to look through the general information?

[TJ]: Yeah I did, yeah.

[NK]: Is it correct? As far as you can see?

[TJ]: I think it is, yeah. We have been running for 17 years, not 15, but apart from that I think everything else is fine.

[NK]: Okay, sorry. So one question left then I think, how many countries in Africa do you work with?

[TJ]: It's like the question, finding out how many countries there are in Africa is quite tricky. Depends on which ones you actually recognize as a country. But the last count when I looked was something like 41. Which is pretty much most of them. But that includes places like the Comoros islands and Somaliland, which is still not recognized internationally as a country.

[NK]: Yeah just for me being able to distinguish between different companies within the answers they give for the interviews.

[TJ]: Further a field we actually deal with about 80 countries around the world.

[NK]: Ok, I think we can dive right in. Because as far, or if you wanna maybe give me a general introduction on [organization 02]? If you want to.

[TJ]: Yes, certainly. [organization 02] was started by myself and my partner about 17 years ago, with the specific remit of initially building anesthetic equipment for low resource settings. That is our entire market. We do not make equipment for high income countries at all. I think to try and do both, you end up making compromises in both directions, and I think that's not a good thing.

I have just written a draft of a document which I'm going to publish at some point, but I'd be happy to send you a copy of that, it identifies a lot of the barriers around trading in low resources.

But since we've started, we now deal with a lot of the big NGO's around the world and have done for a decade or so. But it's a very small pool of companies that actually work in this field. The barriers are substantial. And in my opinion, getting much worse at the moment.

The problem is that the medical device industry and the pharmaceutical industry are entirely focused on high income countries.

And the rest of the world doesn't have a big spend, so the big companies just are not interested in it.

[NK]: Yeah.

[TJ]: So that's the real issue. If COVID-19 only affected low income countries, we would not have a vaccine yet. I'm convinced on that.

[NK]: Yeah I can imagine. And, because you now GOAL3 a little bit right?

[TJ]: Yep. My quality managers have been dealing with them as well, on similar issues.

[NK]: Because they are a startup also totally focused on low resource settings right now with a focus on Africa. And I'm doing this research to be able to, maybe because they've found these areas to be a problem like the upper level so they know maintenance things. They know training is a thing, but they haven't done actual research into it. So I'm there to do that for them. But also for Saba, who is my supervisor from the TU Delft?

[TJ]: Yep. I spoke to her when she was at Kings in London.

[NK]: So

[TJ]: Yeah, and then I think the GOAL3 guys are in Malawi at the moment?

[NK]: Yes, I think they've just returned because the Dutch government sent out an, not really an order, but you had to fly back I think the latest Sunday night because of the Omikron variant.

[TJ]: Gosh. Ok, Malawi is a country I know very well and there was a survey done a year or two ago stating that about 70% of functioning anesthetic equipment in the country was ours.

[NK]: That's a good score.

[TJ]: You know?

[00:05:27]

[NK]: Cool, very cool. Cause I'm just diving into things that I'm interested in, so one of the areas I've found in literature that seems to be a problem is maintenance.

[TJ]: Yep.

[NK]: And mainly the lack thereof and its impact on the lifespan of materials in low-resource settings. So because you have 17 years of experience, and I think you probably started with knowledge already on this problem, but it has probably evolved over the years.

So I am very interested to know how you strategized on this? How did you start out with the maintenance and how has this evolved over the years, and why?

[TJ]: So my background is in engineering. Originally aerospace, and I was even involved in building a couple of satellites.

And you don't go up and service a satellite every three months. You build it to run and run and run and it appropriate engineering can do that to a large degree. So we've tried to

minimize the amount of maintenance that our equipment would need, and that's a relatively straightforward thing to do if it's high up on your list of priorities.

And alongside that we need to provide good training materials for people to understand the equipment. But it's at a lower level than people often think. They start talking about training biomedical engineers in Africa and that really doesn't work. You need technicians at a much lower level to do general maintenance. If you train somebody to the level of a biomedical engineer in Africa he's almost certainly going to leave. He will go elsewhere

So that's a real issue and a lot of engineering staff in Africa are poached by the West, the same as a lot of medical personnel, so that's a big issue. And I think sometimes the focus is too higher level and not really on the people that need to do the work on the ground. In most cases what you actually need is somebody to do some diagnosis.

[NK]: Yeah.

[TJ]: And then go back to the manufacturer. We do a tremendous amount of maintenance, via video. The technology is good now. WhatsApp, FaceTime is very easy to use and if you've got the equipment here and they've got the equipment there, you can very easily find what's wrong and that's worked extremely well for us over a long period. But this business of designing stuff to work in those environments is extremely important.

[NK]: Yeah.

[TJ]: And unfortunately there is a big mismatch there with the international standards which are focused on high income countries and developed in high income countries, I have to say.

[NK]: Yeah.

[TJ]: But it is also the case that the entire medical device model in high income countries is, one of, make the capital goods as cheap as possible while you make all your money on service contracts. Service contracts are not gonna happen in a war zone or in a very remote area. So there's a real mismatch there, with those sort of issues.

[NK]: Yes, because I did see that you provide a lifelong, which is not a service contract then, but lifelong support for your materials?

[TJ]: Yeah, I mean, I get emails quite often from people who have equipment and it's over 10 years old, and we do our best to put it right where we can, and we're pretty successful in that.

[NK]: Very cool to hear. Because service contracts, I heard from [Company 01] that reverse logistics are not really a thing in most places in Africa.

[TJ]: No it's not.

[NK]: So then service contracts and warranties sound really nice, but yeah.

[TJ]: Yeah. I mean, yeah, the other issue is that the medical personnel don't trust the technicians. Technicians are generally poorly paid, poorly represented. They don't have a lot of tools, they don't have access to spare parts, because a lot of their equipment is donated.

If you go into a hospital in the Netherlands, they will have all the same type of anesthetic machines, so you only need to know about one and keep spares for one. In Africa, they will not have two the same in many cases so. That's another big barrier, really.

[NK]: Yeah.

[TJ]: Being able to get diagnostic tools in these places is very difficult, but there is a distrust between, in a lot of cases anyway, between the operators of equipment and the technicians. So if it's slightly wrong, or slightly broken, they don't report it, until it is completely defunct, nonfunctional, now. And then it's very difficult to fix. So things like planned maintenance, sort of quick fixes on small problems really don't happen that much.

[NK]: And preventive maintenance is that?

[TJ]: Yeah, I'm not sure they have a word for it in Malawi and many other countries. Most of the maintenance certainly on my equipment in Malawi is done by an anesthetic clinical officer who's extremely *[inaudible]*?

[NK]: And then so you have a representative of *[organization 02]* kind of going around?

[TJ]: He's not really a representative, it is a very good friend of ours and I know him well. I do a lot of favors for him and he does a tremendous amount of favors for us. And he knows pretty much all of the anesthetic operators in Malawi. And if one of them has a problem with our equipment, they go to him first.

[NK]: Uh-huh.

[TJ]: I have a conversation with him. We work out what is wrong and I send spare parts.

[NK]: And has this kind of interaction with giving the support you need and the spare parts? Has this changed over the 15 years a lot or has this always been your strategy?

[TJ]: I don't think it has changed that much. It, you know, we try to make everything we do, if we take the anesthetic machines, all the anesthetic machines have the same components in them really. And the ventilator for ICU has the same components in as the ventilator for the anesthetic machine. The software in it has been the same for the last 10-12 years and we don't make those sort of regular changes to our equipment. So unless components go completely off the market, we don't change things unless we really have to.

[NK]: Okay and the spare parts do they come locally, do you make them in Africa? Or are they from the UK mainly.

[TJ]: Mainly from the UK. So we can keep an eye on the quality of what's going on, but we make pretty much everything ourselves here. We have suppliers, but they've suppliers have components, not suppliers of subcontract parts.

[00:13:23]

[NK]: Yep, and then for the training of staff on usage of your materials before deployment, or when implementation and how they. How do you guys do that?

[TJ]: Everything goes out with manuals, but it also goes out with videos on USBs. And there is a lot more information on the web as well, and we have a number of, increasing number of small video clips to do certain things, so if the same problem arises, then we sort that out with the same sort of solution. Literally straight off the system.

[NK]: Yeah.

[TJ]: Now that works, that works really well. You find the people in these environments are extremely clever and extremely good at making do with what they have because they have to. It's no good supplying them with, you know, single use items because they won't be able to afford to replace it. It will always get reused. So you have to accept that from the start, I think.

[NK]: Yeah, so like the consumables, you try to minimize those as far as possible.

[TJ]: Yeah, everything we can is autoclavable or at the very least sort of reprocessible, as far as some sort of cleaning protocol.

[NK]: Yeah, cause it then? I guess the manuals are both for how to maintain the product, but also on how to use it properly?

[TJ]: Yeah. And we have sort of, um, initial setup guide. And then there's a few things to check to see that things are functioning properly.

[NK]: Yeah okay, and is there something like the videos where they are already part of your strategy at the beginning or did it start off with manuals and then gradually go towards more and more interactive?

[TJ]: Yeah, 17 years ago videos were not that common.

[NK]: Yeah, I can imagine.

[TJ]: So yes, that strategy has changed or developed at least. But it's much easier to do now and we're finding using animations work extremely well. I don't know if you looked at any on our website, but we got some good animations on there. Now a lot easier to do for if you're gonna need to do translations or if you're going to change anything you couldn't, you can make those changes a bit easier than reshooting a new video.

[NK]: Yeah, I can imagine. So you have those available in multiple languages to be able to train your staff.

[TJ]: We can do. Usually it's someone request more than anything else. Languages are an issue in Africa. There are a lot of them. I'm not sure people realize just how many in some cases. You know, there are very few countries that only have one language. Somewhere like Ethiopia has 80. Papua New Guinea has 800 languages.

So it's picking the common languages in there, but generally speaking if you cover English, French and in some countries perhaps, well, certainly in Africa there's a couple of Portuguese speaking countries, but most of it is covered by those three.

We do quite a lot in some Arabic speaking countries as well, so some of the stuff we've got is in Arabic.

[NK]: So that seems to work very well then.

[TJ]: Yeah, even in countries that have different languages, like in Iran with Farsi, Afghanistan with a couple of major languages as well, even Somaliland. They can all speak or read Arabic to a degree. There's a lot of commonality.

[NK]: I've heard from some of my colleague interns as well, they've spoken to some Malawi nurses and hospital staff and they all speak excellent English, or at least well enough to be able to interview them.

[00:17:52]

[NK]: Yeah, then, I think your product is very tailored towards maybe doctors? Or anesthetic nurses also?

[TJ]: Majority of equipment is used by anesthetic nurses, or anesthetic clinical officers so their training may be a little limited. But what they know and what they do, they do very well. So much quicker than Western doctors do. I've spent quite a lot of time in the hospital in the UK, and when you go to Africa things are so much quicker.

There's a lot less fuss, which can be a good thing and sometimes a bad thing. But the anesthetic, I know lots of anesthetic nurses in Africa, the time it would be happy to give me an anesthetic and I know quite a few doctors in the UK I would not like to give me an anesthetic.

[NK]: Uh-huh. That's quite a distinction, yeah?

[TJ]: You can quote me on that.

[NK]: Good ok, cause then um. Your machines with like this, CE certification and all the fuss. That gives you said that the guidelines are mostly focused on high income countries. So maybe also they like their approval stamps you needed or.

[TJ]: So the majority of products are currently CE marked. That is becoming increasingly a problem. The medical MHRA in the UK, the regulatory body. There's actually quoted before that it takes between 4 and 7 years to get a product through approvals. That's just insane. And it is also extremely expensive and increasingly expensive. Now notify body in the last couple of weeks. It's just put their prices up by 40%.

They largely have a monopoly. The new MDR medical device regulations, rather than medical device directives that's on its way in. That's gonna complicate things even more. It's very European centric and a lot of the criteria that we're trying to meet really don't fit products we're producing. That's the paper I mentioned earlier, that is around those issues. As with Delft and there's a number of places now, though they've got spin out companies with new medical devices for low resources that are fantastic. It's a really good university Delft I've been there quite a few times. I'm looking forward to coming back to be honest.

But for a startup company, it can't wait four years to get a product on the market. It's just not gonna happen. And the mismatch between the standards required to meet the MDR and the standards or the criteria that you've gotta meet to make equipment work in these countries. They are very different.

[NK]: No.

[TJ]: I was, I did the job but the Red Cross is Abéché in Chad some years ago and it was 52 degrees in the operating theater. Nothing like that happens in Europe, and equipment isn't designed to work in that. And, you know the oxygen in Africa in the cylinder may be down to 70%. Modern medical equipment will simply turn itself off. It won't function, it's of no use in those

environments. So it's really a difficult line to walk with meeting the European standards to get the CE marking and making something that works in low resources.

Unfortunately the big funding bodies find it much easier. It's just the lazy way of setting a tender, it's to say it needs to be CE marked. That and, but that's a fact, but it's something that really does need to change. And it needs to be functional to go into these locations, and much of it frankly, is not.

[NK]: Yeah, 'cause I think that's the big motivator of my doing my research. But also why I did research because the 70% of a mismatch is very high and as a startup company wanting to develop something that actually works there, 70% of non-working devices is very scary to say the least.

[TJ]: Yeah, and they are all devices that are CE marked and still do not work, so something is wrong there. There is another issue as well in that, very sadly, a lot of equipment is dumped in Africa. It is sent out, nonfunctioning and they know it doesn't work. But to dispose of it in Europe is quite expensive. Ticking it off your balance sheet as sending it as aid is a very easy thing to do, and I'm increasingly seeing that happen, which is disgraceful.

[NK]: So that companies from that, so that people in Europe are sending already dysfunctional equipment to Africa because it's cheaper. Or what do you mean?

[TJ]: Uhm, just to get rid of it. They pretend it works and send it as aid when actually it doesn't. A friend of mine actually had a piece of equipment donated to him from a UK hospital that had a label on it saying it doesn't work, send as aid.

[NK]: Well. That's not very nice, that's really weird.

[TJ]: It's not right now, but, yeah. If somebody did a survey of donated equipment, we already know that most donated equipment doesn't last, but an awful lot of it doesn't work when it gets there. That can be blamed on its transport and the environment, but in many cases I think that it simply didn't work before it was sent.

[NK]: It's also a weird thing, because then still a company from here could say that they're doing a good thing, but they're really not.

[TJ]: Not no.

[00:24:35]

[NK]: Yeah, 'cause I think the fields of like, maintenance, training and organizational change. I've chosen them mainly also because they are mentioned quite a lot surrounding donated equipment. And because some of the, as far as I can gather from, like [organization 02], you explained you have systems in place to uphold, so to be able to provide the maintenance that or it's designed for the maintenance that can be provided there. And the training is there to be able to ensure that people can work with your equipment. And you've thought about consumables? You thought about spare parts? And I think maybe with donated equipment, those things are not really thought about then.

[TJ]: Yeah it is. A lot of the modern medical equipment has, you know, three months service periods as well. It's not gonna happen in an African environment. It's just not gonna be serviced by, not somebody who knows what he's doing. Filters are not going to be changed

on time. Those, and I think this is being recognized a bit now. There's a big project by one of the UN agencies, to look at oxygen concentrators.

[NK]: Is that the maker's hub? I've read about that project, setting up small biomedical engineering hubs.

[TJ]: There is yeah, no. This is, I'm looking at the design of equipment in particular. One of the big projects is around oxygen concentrators. So the UN, one of the innovation departments in the UN has put together a technical specification of what oxygen concentrators need to do. That is beyond the international standards for oxygen bubble traders, so it's recognized that some of the equipment under standards for them are not appropriate for low resources. But it's actually translating that into making some real changes with how equipment is specified for low resource settings.

[NK]: Great. Because did [organization 02] then do a lot of research into what really is needed and how many? Or yeah.

[TJ]: OK, yeah. And that research can only be done on the ground, not only paper exercise. It's not asking questions. I'm afraid you need to go there, roll your sleeves up, get into theater and see what's going on, and see what the issues are. And between myself and others in the company, we have spent a lot of time in Africa in particular, but also middle east, far east.

[00:27:27]

[NK]: And did your, like the first prototype that you tested, was it already close to or did you find out a lot of things when you started first out testing that?

[TJ]: Yeah, we made a lot of mistakes and we certainly learned a lot along the way. And I've gotten much better at asking the question, I think. And yeah, we're talking to people in the field that are very, very clever at what they do. You know, I get irritated by people that think that they are not that clever as we are. I mean, it really is ridiculous, so most of the people I know they're speaking, you know, sort of five or ten languages.

[NK]: Yeah.

[TJ]: They're very, very clever and very, very resourceful. They've had to be in the west, I think we've become lazier. And you know, we don't try to solve the problems that they have. We just tried to solve the problems we think they have.

And that's not the same thing by any means, and I was at a conference some years ago in Uganda. And a professor from the US said, you must not do an anesthetic without an oxygen analyzer, and somebody in the audience stood up, she said, I don't need an oxygen analyzer. It's always 21% because I don't have any oxygen.

[NK]: Yep, very clear.

[TJ]: Yeah.

[NK]: And so does it differ a lot per country, what is needed or is it when you do enough fieldwork because like your product is designed for the does it differ per country or no?

[TJ]: There are some differences. There were a lot of generic problems, power issues, oxygen supply, quality of consumables. The environment itself. Temperature, humidity, dust, all those sort of things vary some across low resources. But some of them are also common. I

mean in the place in Chad is that yeah, the temperature was very high, but the humidity was only about 4 or 5%. So we have real problems with static electricity, so you know. There's no level playing field there. So there are common issues, but there are also area specific problems as well.

[NK]: Yeah.

[TJ]: Some places are very remote, and I mean conflict now... yeah, as you can create quite a lot and conflict areas have their own problems. And Africa has plenty of conflict at the moment.

[NK]: Yeah and did you try and overcome these differences? Maybe in like the training part? Or in instructions? Or is the machine actually different?

[TJ]: There are some variations within equipment, but not much. It depends a little bit on the country is going to. But in the main, we have uh a generic product. I mean we have different anesthetic equipment, simpler anesthetic equipment for different locations or for where people need to be mobile. That can be because their conflict where they're having to move from place to place or it can be because of the remoteness of the area we put some equipment into Mongolia the other year and I'm hoping we're going to be putting some more in shortly.

[NK]: Yeah.

[TJ]: In places like some of the Pacific islands, Solomon islands where they're running on a boat going between islands, Indonesia can be the same. We have anesthetic equipment in Tristan da Cunha which is about as remote as it gets. They're small islands so you know it depends a little bit on that sort of location as to what equipment they have and we have a range of equipment that we could.

[NK]: Yeah I saw that yeah, cause then, I could imagine for the more remote areas it's more important maybe to stay in touch with them for the lifespan of your products maybe?

[TJ]: Yeah.

[NK]: Yeah, because it's everything you do on that side? Do you do a follow up yourself like, does [organization 02] follow up with their... Because you have a lot of consumers so I can imagine it might be pretty difficult.

[TJ]: Yeah, yeah, we're doing more on that, and that's probably one of the better things that come out of some of the regulation and they force you to do post market follow up. And we're slowly getting better at that. We weren't particularly good at it before we were more reactive, but I think we're more proactive now.

[NK]: Yeah, do you have a representative in the countries themselves then as well or

[TJ]: In a few countries we have distributors representatives, but not in a great many.

[NK]: Uh-huh.

[TJ]: Most of our stuff is done direct with the end users.

[00:33:12]

[NK]: And I wanted to ask, I have subdivided the questions into themes, like the maintenance, the training and the organizational changes.

[TJ]: Yep.

[NK]: What is in your opinion, what are the overlapping factors? I think they are interconnected? I could not really find a great framework or literature that really showed in what way or why, especially in low resource settings.

[TJ]: Yeah, I think. It is disjointed, and it would benefit from more coordination between those different areas. But at the moment I think it is very disjointed, there's not much overlap at all.

[NK]: How do you think it can be done better from your experience, like your perspective? Because you have a lot of experience.

[TJ]: Right? How could it be done better? Well, it's a difficult question. I think there needs to be a greater coordination between the funders, the suppliers, people who are doing the training and some of the industry bodies. You know the sector bodies that are around for anesthesia for surgery for urology, for some of the individual disciplines as well the orthopedics.

I mean there are big differences between low resource settings and high, and I think if they were better recognized then I think there would be. Do you get more coordination between them from the everything is different? Equipment is different, drugs are different, even patients are different. In the Netherlands, if you look at the standard sort of surgical list, you notice some of the patients will be in their 90s. They'll have lots of comorbidities. They'll be diabetic, hypertensive.

In Africa, there are three really, areas, and that's pediatrics, trauma and obstetrics. And they have three big issues. Please come so most of the patients are usually young. They usually have one thing wrong with them. They may have very advanced pathologies, but if you could fix that one thing then they go home.

And so there is that big difference between every area of medicine I think in low resources.

[00:35:59]

[NK]: Yeah yeah, OK. I'm just wondering. I got the instruction from Saba to only have like a couple of questions for an hour, but we have some time left. So I'm just looking into.

[TJ]: You can always send me an email if you've got specific questions and I'll do my best to answer those.

[NK]: Let me see if I have. I think what I'm trying to build with my research is just kind of a lens for other companies to look at and see where they might be able to do more to overcome those types of barriers. And I think your input, it's very informative already just because it's all areas I think that should really be looked at when wanting to develop a material.

[TJ]: Yeah. I think one of the perceived barriers to getting medical equipment into low resources is money, and that's not really a barrier. It's the fact that there is plenty of money to put this equipment in there. And unfortunately a lot of it is spent on the wrong thing or spends in the way. The UN published a document on corruption that said between 10 and 15% of all contracts is wasted on corruption.

[NK]: Yeah.

[TJ]: With tenants even 25%. I mean ridiculous levels we're talking about. I'll see if I can dig the document out and send it to you, but to accept that sort of thing, there's something fundamentally wrong.

[NK]: That's really high.

[TJ]: Not talking about a few 100 pounds here, we're talking about hundreds of millions of dollars.

[NK]: Yeah, I think [Company 01] said as well that the ethical for profit companies within Africa, or at least low resource settings are performing better. Also, because in the whole non for profit and that sector the bureaucracy gets the best of them.

[TJ]: Yeah I don't have a problem with a number of not for profit organizations. I think there is a misrepresentation there. In a number of different ways, and this is another issue that could be quite a barrier really is you get a not for profit organization get huge sums of money to develop a product that possible already exists. This has happened to me in the past.

They claim it's low cost and it's not. Effectively, it's a subsidized product, and if a subset of a product is subsidized, is it sustainable for the future? It's only available as long as somebody keeps putting money into it.

[NK]: Uh-huh.

[TJ]: And some of these fundings that goes to the not for profits is very, very substantial. I think in many cases the beneficiary seems to have been lost in this. It is the NGO itself that's the beneficiary rather than what they are trying to do on the ground.

And I say that quite openly and there are lots of NGOs now, they had to do a fantastic job, but I think there are some that if you did a bit of in depth looking at their accounts, you wonder where all the money went.

[NK]: Yeah, I think you've managed with [organization 02] very well to put a product into market that's actually durable when procured. So if people buy it, it's actually doing its job for plenty of years to be able to because it... Is it you think then a problem at some of the products actually need money put into them or need refurbishment every years or two years to be able to keep them running.

[TJ]: Yeah. The lot of those and many of them, if you take things like patient monitors, and the majority of patient monitors, if you get a problem with it after 12 months, you contact the manufacturer and they say send it back. We'll look at it, for a fee.

Well, that's just not going to happen. So that's why you have so many monitors and similar equipment in Africa that really, you know, just sits in the cupboard. It may be that it can be repaired very easily. But if they can't be repaired there, it needs to go back to the factory and that just doesn't happen.

[NK]: And is it even possible to maybe look into electricians? Probably, maybe for the cause it? I think monitors can be quite... it's maybe more electrical fixings than.

[TJ]: Yeah, but you can't, you can't, you know, replace components on a circuit board very easily. That's extremely difficult to do for people in those environments.

[NK]: Yeah, but then the lifespan of the product really depends upon if it just breaks or not before.

[TJ]: Yeah. And they can also be quite dangerous as well if they bypass functions and things. I've seen equipment that's been repaired in these locations, but all they've all over really done is turned off a lot of the safety features.

[NK]: And do you think as a company that is actually implementing their own technologies that it's something that you have to look out for after warranty? For people not to do that specifically.

[TJ]: Yeah, I mean the emails I prefer I get is we think there's a problem what should I do now? The emails that I don't want is we think we had a problem. I've taken it completely apart, now what do I do? And I get both of those.

[NK]: Yeah.

[TJ]: That can be quite difficult. But I think, to try and maintain an element of safety in the products that are out there is really difficult thing to do, but it's that most priority really.

[NK]: Yeah.

[TJ]: And a lot of Western companies are not interested in the fact that if I talk about , anesthetic equipment they'll send an anesthetic machine out that requires three different gases. They know there's only going to be oxygen there, and the quality of the oxygen may not be very good, but that doesn't come into it at all.

And that's really quite worrying in a lot of cases I've seen tenders asking for equipment. Recently there was a tender for Sierra Leone, for an anesthetic machine and they were insisting on Nitrous Oxide. Well, there is no Nitrous Oxide in Sierra Leone. They don't want it. They don't need it. And if you send a machine out there that can use it and somebody turns up with some, you were going to put patients in danger.

[NK]: Because they don't have the proper training to be able to use the machine?

[TJ]: But then you need much better monitoring to use it safely. It's a dreadful environmental gas as well. It should be banned in my opinion. In fact, I'm on my other screen, I've got a letter to the chief Executive World Federation of societies of anesthesiology that says their new guidance on environment to make them look sustainable and clean, are rubbish. I actually got it in red that they need to ban these substances.

Because what's happening is the west is banning them. Nitric oxide is very limited in its use now in Europe, but the companies are pushing it very heavily in low resources. I had an Indian anesthetist, military anesthetist say to me why? Why are you selling a static machine without nitrous oxide on it? He said you can't do an anesthetic without nitrous oxide. Well that's just not true.

[NK]: Yeah that's just difficult. You have proof of concept in many countries that it is possible to do so. It does seem quite difficult then to be able to surpass everything that might do to your machine just by developing it in a way that they.

[TJ]: Yeah, you do get the altercation and the lack of responsibility sometimes. Sometimes we get somebody sends us, a picture of the machine that it's broken down. We're not sure what happened and then when I look at it you know the concentrator is in the machine backwards. And now it didn't just happen.

[NK]: Yeah.

[TJ]: You know somebody's fiddled with it. Well you'd get that, but it's just part of the process really. You have to accept that and politely point out that we need to do a bit of work.

[NK]: And do you think that, providing more now? More manuals probably won't do this, but maybe more training or seminars saying that they, why they shouldn't do this would have any effect or.

[TJ]: I think the greater access to these places with the new technologies, and I mean WhatsApp is a wonderful bit of kit. I mean, it works extremely well. A majority of our contacts from Africa comes through WhatsApp. And videos are easy to send and if they send us a video we can see and hear what's going on. Hearing what's going on is very important. It makes it much easier to diagnose the problem.

[00:46:29]

[NK]: And do you think that the easier, the more open the communication line is the easier or the less those kinds of problems happen and they've tried to diagnose their problems themselves and try to fix it? Or is it still at the same level?

[TJ]: Yeah, I think if they've got access to us, then they're more likely to come to us to help them find the problem, then go looking for it themselves and do something wrong. But it is getting more difficult in a lot of cases. I mean, I've got somebody in Malawi that needs a new battery for a defibrillator. There's nothing wrong with the defibrillator, but the battery that goes in it is a lithium battery that is non rechargeable so, I have had so far three attempts at sending it and the airlines have sent it back because it's incredibly labeled. The last one I sent out was covered in labeled things like this [*shows the labels*].

[NK]: And then it still gets sent back or?

[TJ]: Yeah, another one here. You have to be an expert in transport on some of this, but the battery comes back. They've suggested as a lithium battery that's not enclosed in a product and he sent separately. It should be discharged to 30%, but it's non-rechargeable. So how do you do?

[NK]: That's not possible.

[TJ]: No it is not, so, I'm still struggling how to get it out there.

[NK]: Yeah.

[TJ]: I'll try and think of another way.

[NK]: It is a very specific problem as well.

[TJ]: No lithium battery regulations on an aircraft. I'm not sure a lot of the airlines actually understand their own rules. And I had a complaint from the a civil aircraft authority that was clearly wrong. They did not know what they were talking about.

[NK]: Yeah.

[TJ]: but it's very easy to make mistakes with that. It's a very complicated field and getting more so.

[NK]: Why, because it's more regulated or more heavily regulated or?

[TJ]: Yeah, the number of batteries, the size of the batteries is the number of cells in the battery. The constituent components in the battery all play a part on what you should label it, how it could go, some not allowed on and that can vary with the airlines. That yeah, we will not take a lithium battery on board. You can go on with your laptop or your camera with lithium batteries in, but you try sending one.

[NK]: But and is there a danger to them then or?

[TJ]: There is a risk, but the risks are limited if they're good quality batteries. And if I buy some batteries from China, they just arrived in the post. They don't seem to take any notice of what they're meant to do sometime. I mean the one I'm trying to send to Malawi came from South Korea.

[NK]: Yeah.

[TJ]: Yeah, but it arrived here just in a box. But I'm trying to send them to Malawi, but at the moment in Malawi is not accepting dangerous goods. Which are lithium battery would fall under so you can't even get in the country officially.

[NK]: Anything cause um? That's what [interviewee 1] said to me that it's also happening right now. Is that, uh. People in low resource settings have more access to spare parts, but then through sites like Alibaba, does this happen a lot for your materials?

[TJ]: Yeah, yeah, um. Not so much with us, but I think in a lot of cases they'll buy something that is very similar but may not be as safe or you may not get the equipment to operate in the way that it should. So some of those things are quite dangerous.

[NK]: And is it then, like, uh, isn't the monetary issue you think that they order it there or they just don't know that they could probably get spare parts at...

[TJ]: I think, I think it's partly a monetary issue and it's partly an issue of logistics getting it there.

[00:51:08]

[NK]: Okay, yeah, Very interesting. It's I think this one is for this topic all very interesting. I don't know for whoever. It's a very interesting research still playing because and so.

[TJ]: it's a very important topic. I think you picked a good subject, certainly, and I'm glad you spoke to [Company 01] as well because I think that they have a different take on things.

[NK]: Yeah, but a very broad spectrum of knowledge as well. They know a lot about the funding and the communication lines between other sorts of things. It's very interesting to talk to her.

[TJ]: Could I give you a good contact?

[NK]: Yeah again, she gave me some names as well for other companies.

[contact information]

[00:52:46]

[TJ]: And it does seem that product development by well-meaning people for low cost products can be a quite challenging area. I mean the pandemic brought forth hundreds if not thousands of homemade ventilators. Hopefully none of them have ever actually been used on a patient, say they would not work and I was often late. I was afraid for translators that

had been run by windscreen wipers. All sorts of things that just would not work. The majority of them are some form of bag squeezer which is a very difficult thing to do.

And I think that sort of goes in phases as well. At one point incubators were the thing to make? And some of those were good majority of are pointless. Like incubators in Africa are actually quite difficult to maintain for lots of reasons, they're difficult to sterilize. They separate the mothers from their babies, which is not a good thing in those environments. You know, even if you go to Erasmus in Rotterdam you know they have 6 nurses to one baby. In Africa they'll have 20 babies to one nurse and that's a different thing altogether.

And then we had things like, phototherapy equipment all of a sudden there's a dozen different low-cost phototherapy units around. In the last belt with oxygen concentrators you now have a number of open source build your own oxygen concentrators on the web. In my opinion, they're more like...

[NK]: But is that, with the difficulty of CE certification and the like, all the...

[TJ]: Most of them, none of them are accredited at all. In fact I'd tend to refer to them as improvised explosive devices. They are quite dangerous, but like concentrations of oxygen are quite dangerous.

[NK]: Yeah, I can imagine. But this is done, I think because you have like this year. Certified products. But also like these kinds of products, are they easy to come by and use about or is it disregarded by most of those people as well, or?

[TJ]: No, I think it's very difficult, yeah?

[things on other companies, closure of interview]