START AUDIO

Interviewer 1:   I want to ask you about your experience with using asset registers. The research project involves interviews with stakeholders using assets registers with different roles and from different companies. The purpose here is to try to understand the role played by asset registers in the maintenance optimisation and enhancement process. In particular, this research will explore asset register quality, challenges and production. Our research is also interested in the use of digital software technologies for supporting asset register production and use. In part, this research may help the University of Salford (and potentially partner organisations) identify opportunities to develop technologies, techniques or tools to help organisations and support their software development processes. I want to ask you the following questions and tape record your answers. I do plan to publish interview transcripts and extracts. Can I switch on the recorder?

Respondent: Yes

Interviewer 1:   How have you been involved in asset registers?

Respondents: I think since 2009, when I first joined Add energy, we have been using asset registers for almost every single project we have worked on. I have actually counted the projects we have worked, and I think it is 95 projects. Asset registers is one of

the key data sources that we use when we work with our clients. And the asset register is a source of truth for the clients in the terms of equipment they have. And it is really important for us to access that. I guess knowing what they have is the first step and then the improvement journey we want to have with our clients.

Interviewer 1:   So what has been your involvement in the asset register? Can you give us an idea about the experience that you have?

Respondent: The specific involvement is being the one who is analysing to identify the gaps. This is usually the first thing we do. Although there are two scenarios usually. The first scenario is where the client has had an asset register for many years which we usually first analyse. And then I would work on optimizing. The second case is it is a brand new facility that we are building. The asset register hasn't been developed yet. We will build it from scratch. The other thing is the resources that will help you build the asset registers. Other than that it is simply managing teams.

Interview 1:   If you may please speak up so we will be able to transcribe this. Could you give us some examples of what sort of gaps you might notice during the analysis of an asset register.

Respondent: The gap would be typically things like classification of equipment being incomplete or too high level. The classification of equipment I am talking about is usually if you use character set, PU, MO, and identify all types of equipment. A lot of the time it is either too high level or it is just missing all together. The standard usually adheres to ISO14-44. This is very important in terms of data you have in your asset register. The other thing we look at is the hierarchy. That is the hierarchy representation of the relationship between the client and the asset register. Not in all the times, hierarchy is standardized and doesn't follow ISO. Um something else that

we also find is the equipment missing from the asset register. So the way we determine that is we go to the client drawing and extract them from these drawing. We also plan plant walk downs and actually visit the planet. We need to check if the equipment is still there or not. Another factor, sometimes there is equipment as part of the identifier, but when we visit they do not appear on the engine drawing. Then there is further things like the criticality of equipment is incorrect. So criticality revolves around us finding the equipment for the production of this facility. They could be overclassifying things for safety. […]

Interviewer 1:   I suggest we turn our cameras off because we have difficulty hearing you.

Respondent: I will remove my headset

Interviewer 1:   It has to do with the internet connectivity. Anyways can I move to the next question? You mentioned that you do optimization. Can you talk us through examples to the types of optimizations you use at the asset register?

Respondent: Optimization would really be number one on the criticality side. I don't know if it is optimization. You see optimization comes mainly in the maintenance part. That depends how we identify optimization. A lot of the times, if something is wrong, we fix it and we classify it as optimization. But many people find that optimization is actually improving something. So something might be ok but we have to make it better. If you use the second definition, then optimization will be mainly around the equipment description which is a descriptive set of words that tell us what it is. So it might say how centrifugal is type of pump, where it is located, technical information about it and some other related things. The first time we look at that it might just say pump. In an optimization we convert that description to a pump centrifugal and we add information on where exactly it is. So that would be an optimization. Another would be, if an

equipment classification was just pump, we would improve that and make it centrifugal pump. Make it more specific. And then in the equipment hierarchy there would be optimization. Sometimes the equipment hierarchy would be very flat. So they would only have maybe two or three levels. We would introduce more levels to make more closely resembled with the plant structure.

Interviewer 1: So we looked at the analysis and optimization of the asset register, are there any other operation that you have been involved with relating to asset registers?

Respondent: Um the other thing would really be prepare the data and the format for the client to load back to their maintenance system their CMMS. So that would be something else that we would do to allow the client to take advantage of the work we have done. We don't just give them a spreadsheet. We would actually divide the file into a file that they can use and load into their system. And then once the data is in their system, we also double check and make sure that load has been successful and nothing is going wrong. That is important, the delivery side. Other than that, when we do the analysis obviously there are some graphs we choose to give to the client as well as the deliverable. So we will prepare the graphs and the presentations together. It is important to communicate the analysis to the client. And if we are actually doing work to optimize and improve the asset register, we do a before and after set of analysis to show them what they had before and after. So the client would see the benefit of the work.

Interviewer 1: That is interesting because of the questions is how do you asses the quality of an asset register? so maybe you can describe what you touched on there with a bit more detail.

Respondent: To assess a quality, I guess what you can do is: there are things that you can automate and things that are more difficult.

One of the easiest ways to assess quality is just looking for blanks. So if there are important or mandatory fields that should be filled and are not and they are blank, then the most basic analysis is just the percentage of blanks. What is that for the specific field. And then you can just report that percentage. The best example for that would be the manufacture, although it is very difficult. Each piece of equipment is built by a certain manufacturer and that equipment would have a model number and also a unique serial number. So a lot of the time, that data isn't there and the simple way to assess the quality is to see is it blank or not. You have to look at the content as well. Sometimes the manufacturer might be not know. Now clearly that also fails the terms of quality. So you can have a first test analysis that just looks is it blank or not. And then there would be a second test analysis, which you can look at each point. You also need an engineer to look at that data and assess it. So I guess it is a mixture of automation and manual tools to assess the quality in every single field that matters in the asset register. Have an initial automated analysis and then do a second manual analysis to assess it further.

Interviewer 1:   I am asking you to speculate here, what it is the value to the client of having a good quality asset register?

Respondent: So a good quality asset register is really a foundation to their success. Because if you want to first of all understand how you are performing you need to know what equipment you have. So having a complete asset register which is a representation of what you have at the plant is very important to answer the question of what do I have. And the other question then that you want to answer: I know what I have but I need to classify that to know exactly what it is. So I know I have a thousand piece of equipment but I need to know what exactly each one is. So I need to know the manufacturer of that equipment and the model and I can have a parts list linked to it. Or if there are

any operations on that equipment I will be able to reorder the spare parts I need. And if I don't know the manufacturer model then I will not be able to know the spare parts or contact. In terms of the classification equipment, for example centrifugal pump, I will be able to link hat to a maintenance strategy to prevent the failure of the equipment and maintaining that piece of equipment. The reason behind that is to mitigate failure because each equipment has a failure that can occur. The maintenance is there to mitigate these failures by doing various checks or tests as per schedule of the maintenance strategy. As an example, if you have a motor you may inspect that motor every year visual just looking at it to see if there is any issue. So maybe an abnormal noise that you would appear. And then every 5 years you may overhaul the motor that is you take the heart and look at all the parts of the motor and test them up and put them back together again. So having that equipment classification and linking it to the maintenance strategy is very important. If you don't have that it's more difficult to manage change as well. So if I want to change the maintenance strategy for all motors, if I have this little code that I have linked to all motors then I can quickly filter that data and then apply the maintenance role while making the update. And then the other key thing is on the analytics side, if I am doing a key performance indicator for my equipment or KPIs as they call it I can then use these data points as equipment types to report the results to a higher level.

Interviewer 1:   I think you used an abbreviation CMMS?

Respondent: Computer Maintenance Management System. Examples of that are SAP. They allow the client to manage all of the equipment that they have in the system and schedule maintenance and carry out maintenance and report the results. So the system will print out work orders that includes the jobs that need to be carried out by the engineering team on site.

And then the engineering team would be able to go into the system and report the results, the maintenance done, what they found. All this is important. They manage the overall process as well as managing the spare parts and some of the procurement. Some CMMS are linked to the finance system as well. So financial data around cost of equipment as well as their depression and other financial aspects can be monitored.

Interviewer 1: Can you give us a sense of the size. You said that you have done something like being involved in 95 projects. Just give a sense of scale. How big are they? How long does it take to create one?

Respondent: So typical asset register is about 50 000 line items so that is 50 000 unique equipment. I have asset registers go up to 300 000, items that are reference to very large facilities. That is roughly the size. And in terms of the time it takes, 3 months to 2 years it would take to build an asset register. It depends on the size. But the average is like 3 to 6 months. But for 300 000 items it would be a long project. The project length is also determined by the client. We would work with these things with the clients so we can look hey can approve changes. And if this process is slow then it could really take time. And if there is a language barrier because we work with international clients then that can make things more difficult as well. There are a lot of challenges but 3 to 6 months is the average.

Interviewer 1: I realize there is commercial fence but can you give us a sense of the value, how much does an asset register cost?

Respondent: There are many factors around that. It is difficult to give a precise value for that. But between 100s of thousands to millions in dollars. It depends on the clients and there are a lot of factors around that.

Interviewer 1:   Can you talk a bit, from the clients' point of view, what are the challenges they have using asset registers?

Respondent: I think for some clients there asset register may be too big because they include equipment in there asset register which may not be required. So there is a good example of a cable. There is a debate of weather that should be included in the asset register or not. One of the first things we do is create rules around what should be in asset register and what shouldn't be. There are questions that could be asked to know. Does that piece of equipment appear on the drawing? Is that piece of equipment something you would want order spare parts for? Is that piece of equipment something you want to report failure? Thera re many factors. There are no universal standards around this. It is for the business to know what to include and what to not include. There is a challenge because having so much information can be difficult to manage and expensive. So one of the things that we would do is try to optimize that to reduce the number of equipment in the asset register if possible. Some of the other things they struggle with is the equipment type that are too high level. For example the equipment type is just pump. When you try to filter that data, you know if you have a 100 thousand item in the asset register, you might have 3000 pumps. 3000 is quite a lot, so if you could break that down to the centrifugal pump and to all the different types of pumps then it would be a lot more manageable to look at the data. So that could be another challenge. There is a lot more. Data could not be updates when things change. So management of change is the biggest issue our clients have in terms of their asset registers. By change I mean, if a new piece of equipment is installed, it isn't necessary reflected in the asset register because the process isn't follow. Sometime there is no process which is even worse. So that management of change could be a real issue.

Another thing is maybe a piece of equipment could be from one manufacturer but it is replaced. And the piece of equipment is now made by another manufacturer. That data is rarely updated for example. There is many challenges. Another key one is that on your asset register there are linked documents, so the linked documentation is there to link your USMS to your document management system. And sometimes the link isn't there, or is incomplete for many of the equipment. So it is no easy way to get the technical documentation for the equipment in terms of your maintenance manual and data sheets etcetera. So that can be a big gap for many clients.

Interviewer 1: So let us turn our attention to the product of asset register. You have been involved in producing asset registers without using any specialist software tools. Could you talk us through that process?

Respondent: So typically that process would involve a spread sheet. So you would receive the initial data from a client in an excel format typically. And that data would be incomplete. We tell the clients what exactly need to be build, what the rules are around the asset register, what equipment type codes you need to use. Sometimes the client don't have standards so we need to propose standards for them. Then we would work with excel. There would be a few people using that. The typically there would be a lot of emails going back and forth. Or excel files being checked in and out of share systems or some Microsoft products. So it is quite challenging because when multiple people are using it people may override each other's data. Which will be a big problem. So typically it would only work when only one person is working with us. If there are multiple people then there would be all kinds of issues. And the other problem is that people would add a lot of columns to the spreadsheet and the files would grow. People would have a lot

of formatting and put a lot of formulas in. and this slows down the spreadsheet over time. So that process that we have is difficult to deal with a lot of those things in excel. And even people still manage to find ways to cause issues or damage to the data. Controlling the work is quite difficult when we use excel. And usually when the data is built in an excel, we will email that to the client and the client will review the data. We will send comments back. And sometimes this is done through a workshop so there is someone there. Either updating the spread sheet live or they would take notes and then come back to the office and update the spreadsheet with the client's feedback and approval as well. So end up with these spreadsheets that are 50 columns or 100 columns. And it is very very challenging to work with. And it reduces productivity and quality as well.

Interviewer 1: Should we go on with Asset C. What is Asset C? What is the purpose of Asset C?

Respondent: So Asset C is what we call an ETL software. ETL is extraction transformation and load. So extraction is you would extract some data from a clients' maintenance system or CMMS. Transformation is you transform that data in some way. In this case we are transforming the data into an asset register optimizing the data and then you would produce the load template which will then we loaded back to the ETL system. Then obviously you would verify to make sure the data in the CMMs is what you intended to load as well. Which is the final quality check. So asset C lets you do the transformation part and the load part in terms of breaking the load template into the asset register. The extraction part is usually done by the client and imported by us if we have access to the EMMS system. We would import the data into Asset C. so Asset C is really designed to get the control over the building of an asset register by making us monitor for example who is logging into

the system and who has access to the data. And also having multiple trails of data changes in the system. Meaning we would recording when users change records when user create or change a record. We also have a log of changes so we can see for every record what all the teams did over the last 30 days. We could go beyond that if we really wanted just to have an overview. We can take daily backups of the data where as previously with excel you would have to manually do that. Obviously users could log into it anywhere. Whereas previously in excel you would have to email the file around and also consolidate changes from multiple people. With Asset C it is a life system so you could log in from multiple places. And also clients can log into it and collaborate with us and approve things. Rather than having to send lots of emails back and forth. So it just makes it a lot more interactive for everyone to use. You can use it at anytime from anywhere. It is designed for the desktop so it is not really a mobile app. And another factor of Asset c is automated project where we can create reporting the progress of a project automatically. Whereas previously when we were doing it with excel that was difficult. With this approach we can have a uniform report o all of our projects. And have an update automatically ad customize our report based on the client. There is a lot of things we can do additionally with the power of the cloud.

Interviewer 1:   You mentioned several times the productivity issues with using spread sheet. Do you have a sense of the productivity improvement you can get from using Asset C?

Respondent: So we did a good project with SPM which is a client of ours. We have genuinely seen productivity increase with a factor of 2 or 3. It depends on the task. But overall I think you would see 2 or 3 times faster in doing things compared to excel. And that also the quality issues that come from excel and not having to go back and do viewer. If you think about the total time it takes

for the project. It is not just about doing the task it is about doing that task well. There is no viewer fixing that needs to be done later. So that is also quite important in the total time.

Interviewer 1: That is really interesting. Okay.

Respondent: One other thing that I should mention that in the future we want to put automation to the process as well. To increase that 2 to 3 factor further. But that will take some time because more user feedback is needed.

Interviewer 1: For the scope of this interviewer we are less interested in what is going to happen in the future. But we want to capture productivity and quality. And you hinted about one way to measure quality, spending less time doing rework in side Asset C then you would have done if you were using a spreadsheet. Have you had the chance to get a measure of that?

Respondent: There is not an exact measure of that. You see we don't always have to do the same project using excel and so it with Asset C. but generally speaking I think viewer would be reduced by 50% minimum up to 200%. It really depends on the project. And also remember, if you are using Asset C and you are an incompetent individual, things can still go wrong. So if the content you are putting into isn't quite right then things could go wrong. The thing about Asset C is that we can pick that up earlier and tell the user for example that they did a mistake. In excel most of the cells are free text entry while in Asset C you have to pick up from a drop down list and if you don't it turns red or it gives you an error. So that stops problems. But if you pick the wrong thing it does not necessary track that. The important thing is to limit what the person can do to the data and make it more atomized. But we cant go all the way yet. And I don't think it is possible to go all the way. You can control the data well using Asset C.

Interviewer:	So Asset C helps with the productivity and quality of the asset registers that are produced. Are there any benefits that you can think of?
Respondent:	I think it improves transparency. Because the client can access the Asset C and see what we are working on. So they have a black box and they can see the progress daily if they want. Whereas is the past we will go work on an excel and come back three months later. You can think about it as if you are setting a project to be more agile. To show the clients snapshots of what you are doing earlier and get feedback earlier. Whereas in excel it is quite difficult because you have to consolidate a lot. Because there will be 5 different people working on the spreadsheet. They will have to be consolidated and sent to the client every week. Whereas in Asset C you don't need any of that. So previously you wouldn't do that with the client because it adds overhead and cost to the project. Whereas now the client can go in everyday and give you feedback. The client can access the data and fix things. And that is what they did with the SPM. The client was finding typos for example. And he was fixing it himself. We would have a notification obviously that the client has done that. But that is fine and that is great because that is the kind of collaboration we are looking for. Whereas in excel it is difficult to do that. So I think transparency is the other key benefit that Asset C provides. I also think security as well. The data is more secure because it has an encrypted log in. and previously things were being emailed and a lot of data would have been stored on people's personal machine. It is more secure to have things centralized in one place then having files all over the place.
Interviewer 1:	Well I think that you touched on the fact that someone could delete a row or something in the spreadsheet. And how could you ever discover that.

Respondent:	Exactly. And in Asset C for example, if you want to add another column you can do that but you can't just delete a column. That would need to go through some process. So this functionality is turned off and you can't do it unless you speak to someone. The other thing is that if you are adding a column, you need to speak to someone and approve that because that could mean a change of scope. So in terms of scope management Asset C is good as well. Because we can actually identify the changes to scope and if they are happening. And we can bill clients and optimize the process. Because we can see oh you just added another 8 columns, who is going to pay for that extra work that is needed to fill those columns. Or oh you just added 2000 pieces of equipment, and our scope of work was just 12000. Previously this was difficult with excel but with Asset C now, we are able to manage the contract and have a CVO, contract variation order in place. And that means that we can make money on the job instead of losing money. Sometimes you may have a good relationship with the client and accept changes and let those happen. But you need to do that in a professional was and let those happen and then it is up to the management to decide if the CVO needs to add a cost order or something that needs to change the time but we will not charge the client for whatever reason.
Interviewer 1:	Are there any challenges or draw backs or impediments around using Asset C?
Respondent:	One of the benefits of excel all the data is stored locally. So you can access the data at once. With cloud model, we can only batch the data in like batches of 5000 or 10 000. So we have an option where the client can select how many data records he sees at any one time. And then as he scrolls down the list more will load. So that incremental loading is a big difference. And I think for some users it is a bit of a change.

What we have established through speaking to people is: although excel can let you access all the 100 000 records at once instantly, you don't really want all that information at once anyways. Because one will never work with all the data at once. We work with the data in blocks. So that can be seen as a psychological impediment for some user. But I think that is not a real impediment if that makes sense. It is more about educating the users on, how you actually work. Another difference is sometimes users want to add just lots of columns and Asset C doesn't let you do that. So again that is an education thing where you need to make sure that the users are aware of that. So we have locks so that you cannot add things whenever you want. A lot of the impediments are more cultural and education and it is something that we need to explain to users to make sure that they understand the philosophy behind Asset C. so when they use it they understand some of the limitations compared to what freedom they had in excel.

Interviewer 1: That is great. The way it works from a client's point of view, does each client have an account or an asset?

Respondent: We would have users. You would have email addresses and users. And then we have a project. The project is linked to the company and the company I slinked to an organization. So an organization would be BP and the company would be BP UK and then there would be a project. And each company can have multiple projects. So you might have BP UK Project 1. The project is linked to a data set. So that is how we manage it. And the users will have access to the project. The users can be from the client's side or Add Energy side.

Interviewer 1: Is there a sense that you can harvest data from the asset register in Asset C?

Respondent:	Depending on the client permission. There is the opportunity to learn from the data in terms of understanding what the before and after is. And potentially try to get a system to learn what happened in between. There is other factors around can we use the data to try to identify norms for some of the data sets. So there are various spots of where we can use the data. But I think we would want to get a lot more projects on to Asset C and a lot more data.
Interviewer 1:	Being the devil's advocate. Looking at it from another point of view, an impediment from a customer's point of view they lose control of the data when using a cloud. So you could promise to never so anything with the data without their permission. Which is not what you get when you sign up to Facebook. So I am wondering if you had any conversation with the clients around that issue?
Respondent:	I think we have a non-disclosure agreement with the clients. So that limits us to what we can do. So we wouldn't be sharing this data with a third party outside any existing arrangements we currently have. We wouldn't share that data with individuals within the organization who are not authorized to have access. We have limitations. And they are generally quite robust. Historically speaking, any data standards that we have developed have been done independently and they have been inspired by data that we have seen with clients and engineers and the experience that we have had internally. But we believe in building things from scratch. And if there is good practices that we see from different clients we can learn from that and use that in our thinking. Again it is all about transparency and being clear with clients. If there is something that they want to contribute to and help with they can opt in and we will be able to use that data anonymized to improve what we deliver. I guess at the end of the day this is what we strive to.

Interviewer 1:	I think I came to an end with my questions. Scarlet, do you have any questions from your end?
Interviewer 2:	You mentioned that clients face challenges, are you informed about these challenges? If yes how do you respond to that?
Respondent:	So usually before we start with the project we have those conversations which are part of the sales process to understand the client's drivers and problems they have and how we can help. This will be passed on to the operations team and this will be part of the planning for the project. There may be impediments and things you find out half way to the project. Maybe there is an issue that the client had and they learned from and passed it down to us.
Interviewer 1:	Is there anything else you would like to discuss that we haven't touched?
Respondent:	Um I think we have covered most things. Nothing else really comes to mind that I think of.
Interviewer 1:	This is earlier stage for us and we are still learning. If you don't mind we might want to try to come back to you in the future for follow up. Will that be okay?
Respondent:	Yeah no problem
Interviewer 1:	Thank you. We will try not to bother. But you know if there is something I haven't thought of. For the purpose of the transcript records, can I just ask you your full name?
Respondent:	Hossein Abbas Ghavimi
Interviewer 1:	What is your title?
Respondent:	Research and Development Manager
Interviewer 1:	How long have been working in Add Energy?
Respondent:	Since 2009

Interviewer 1:   Have you worked in similar roles before that?

Respondent: I worked in oil and gas a year before that. I was in an IT support.

Interviewer 1:   What is the highest academic qualification you have?

Respondent: BS then I started the master but I got a post graduate certificate.

Respondent: Thank you.

END AUDIO