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IN THE HIGH COURT OF SOUTH AFRICA
(NORTH GAUTENG HIGH COURT, PRETORIA)

CASE NO: 35421/07
DATE: 15/12/2010

IN THE MATTER BETWEEN:

SPX TECHNOLOGIES (PTY) LTD **PLAINTIFF**

AND

BETTERECT (PTY) LTD **DEFENDANT**

JUDGMENT

OMAR, AJ

This is an action in which the plaintiff claims an amount of R1,8 million (reduced to R1 794 953,40 during the trial) from the defendant on the basis that the defendant failed to fulfil its contractual obligations to the plaintiff in the carrying out of the work commissioned by the plaintiff during September 2005.

Counsel for the plaintiff, in his opening address submitted that the plaintiff's claim is based on four (4) interrelated contractual grounds, namely:

a) A warranty contained in the standard terms of contract;

b) That defendant contracted to produce the shafts in a proper and workmanlike manner;

c) That defendant would supply equipment capable of performing the purpose for which it was purchased and failed to do so;

d) That defendant undertook to produce welds which were continuous and free of imperfections.

The case is about, what the plaintiff says is poor welding and what the defendant says is poor design. What the defendant says is that none of those causes of action covers a situation where the failure of the shafts was due to a design fault, and the defendant denies that it was caused by poor

workmanship. The plaintiff quite readily concede that, if it is established that it was because of the design that these welds of the flanges onto the shafts failed, then the plaintiff does not have a case. The plaintiff says that because of bad welding and the cost of replacing the shafts, the plaintiff should be put in a position that it would have been in if the contract had been performed. Although the quantum is not admitted, the plaintiff will lead evidence on what it spent.

According to counsel for the plaintiff, the question to be resolved is thus whether the plaintiff has established either a breach of the guarantee, a failure to effect the work required in a proper and workmanlike manner or that the welding performed by the defendant was neither continuous nor free of imperfections. If so, the plaintiff would further need to establish, that such shortcoming lead to the failure of the shafts.

Counsel for the defendant submitted that the concession made by counsel for the plaintiff, in his opening address, was quite rightly made as, in order for the plaintiff to be successful in its claim, it must prove that the alleged defective workmanship (which is denied) was the cause of the failure of the shafts and, therefore, the cause of the plaintiff's damages.

It is common cause that:

a) The agreement between the parties was concluded during or about September 2005 and that both parties were duly represented.

b) The plaintiff placed two written orders with the defendant annexed to the particulars of claim as annexure “A”.

c) Annexure “A” incorporates the contents of annexure “B” to the particulars of claim and the guarantee.

d) The guarantee relates only to defective workmanship.

e) The defendant was to conduct its work in accordance with the drawing annexed to the plaintiff’s particulars of claim marked annexure “C”.

f) The drawing specified a weld which was not a full penetration weld, a landing of 10 mm and a weld preparation angle of 30°.

g) The defendant in concluding the agreement did not profess to be knowledgeable in the process of biox slurry.

h) There was a lack of fusion and penetration between the welds.

The plaintiff called four witnesses to testify on its behalf, namely Mr JA Derham, Mnr MC Van Wyk, Mr G Kotze and Mr AA Cordozo.

The defendant called five witnesses to testify on its behalf, namely Mr Wehmayer, Mr DP Bosman, Mr C Felipe, Mr LG Kometas and Mr RD Klima.

Mr. Derham and Mr Van Wyk testified as expert witnesses on behalf of the plaintiff and Mr Kometas and Mr Klima testified as expert witnesses on behalf of the defendant.

The evidence of Mr Derham, briefly, was that he has a B. Tech degree in mechanical engineering and a PHD in computational fluid dynamics. He began his professional career in 1972. He is currently a business unit manager for Mixers in EM & A and had exposure to welding technology. He was aware of the contract which forms the basis of this matter in that the defendant was contracted to fabricate certain shafts for the Bogoso mine in Ghana. He first became aware of the problem during January 2007 when he was informed that one of the shafts had failed. Because the relationship between the UK and South Africa was very supportive to South Africa for technology, he was made aware of the failure. Mr Van Wyk of BIE was then sent to Ghana to make an investigation. During April, May or June 2007 more shafts had failed and probably one of the conclusions of the BIE report was that there was a potential for other shafts to fail. A decision was taken to manufacture then (10) replacement shafts on an immediate short-term basis and to send those to Ghana and have the original shafts changed out. He was part of the decision and because there is a lot of competition coming into the biox field for the supply of equipment, these contracts are worth several million dollars to the company who wanted to maintain its dominant position. Had the company decided to leave the shafts and wait

until a shaft failed before replacing it, relationships would have soured with Goldfields and the mine in Ghana because they would not have been producing gold. During September or October 2007, he visited the site to review general conditions at the job site, to look at the success of the replacement programme that would have been put in place for the shafts and to talk about problems that existed at the job site. He was taken to a compound store where there were a total of five (5) shafts located which he visually examined and took photographs off which is marked as exhibit "B" in the papers.

From his observations and what is contained in these photographs, he drew the conclusion that the welding of that joint was of poor quality. He could see from the photographs and could also refer back to the BIE report that there is clear evidence of lack of fusion between the flange and the bar which constitutes the shafts: the weld material had not adhered to both the flange and the bar in many areas. He drew the conclusion that there was no adequate fusion between the flange and the shaft or the bar and the shaft and it indicated poor workmanship and lack of fusion. The photographs correlate with what he had observed. The fact that he could see that there were machine marks indicates that a total lack of fusion occurred in that

area. It was common cause that the weld between the flange and the bar was not a full penetration weld because there was a 10 mm landing. The flange coupling was not prepared correctly. Because he wanted to satisfy himself completely and absolutely, that access of a welding rod into the area, the root of the bar to the flange, was made accessible, a full scale test model was made and access was perfectly accessible. During June 2007 his company was busy supplying a similar product to another mine somewhere in Uzbekistan and have not suffered any failures. He disagreed with Dr. Clemen's report stating that failure due to weld defects, wrong welding perimeters or bad workmanship appeared to be highly unlikely as no such evidence could be found.

Under cross-examination by counsel for the defendant he stated that he is no longer involved on the technical side and after the last four to five years he has been involved on the business side and is therefore no longer exposed to the technical side of welding of this nature. The relationship between the plaintiff and his company is close and supportive and share in each other's income. By the time he attended the site in order to conduct his inspection he had already seen Mr Van Wyk's report and had heard the complaints of the plaintiff in regard to the alleged defective workmanship.

He requested the shafts to be changed out before a proper inspection had been undertaken by him. His inspection was merely a visual inspection and that no scientific or metallurgical testing had been done in order to determine the cause of the defects. No cutting or any micro-sections or macro-sections had been done. He had only inspected the shafts during October 2007, some ten months after the failure of the first shaft in January 2007 during which time the failed shafts had been lying in a compound. During the time the shafts were lying in the compound, they were not in an elevated position but were lying on the ground and were exposed to the elements which caused rust and no steps were taken to minimise their exposure to the elements. He had seen the shafts before they had been installed but raised no concerns regarding any of the workmanship which would have been apparent from a visual inspection thereof. The plaintiff did not provide the QCP to Mr Van Wyk for the purpose of conducting his investigation. In his view the QCP was not signed off by the plaintiff and he was surprised that it was signed off by Mr Bosman purporting to act on behalf of the plaintiff. He confirmed that the QCP was in the plaintiff's possession and was therefore aware of the fact that Mr. Bosman was purporting to act on behalf of the plaintiff and did not raise any concerns. In purporting to sign the QCP on behalf of the plaintiff, he verified that the

equipment had been manufactured in accordance with the standards required by a final inspection and release and verified that the work conducted by the defendant had been carried out in accordance with the drawings. He was not a qualified metallurgist and was therefore not in a position to dispute the findings made by Mr Kometas, the defendant's expert. He did not agree with the recommendations of Mr Van Wyk, the plaintiff's other expert, that the weld preparation be changed from an angle of 30° to a minimum of 45° – 60°, that the weld preparation be changed to full penetration weld and that the drawings be changed. He also stated that the sample utilised by Mr Kometas and Mr Klima is too small and is not reflective of the equipment.

The evidence of Mr Van Wyk, briefly was that he is currently a Technical Manager for a company called British Inspection Engineers which is involved in quality assurance and quality control expediting of projects. During February 2006, he was instructed by the plaintiff to investigate the cause of a failure on a shaft to flange configuration at a plant in Ghana. He was not supplied with any documents at all, although he requested it. He had a look at the flange and took some photographs which are part of the court documents. He brushed it clean because it was full of dirt and mud.

He was assisted by Mr Gouws who is the Ultrasonic testing representative from Gamex. He is not a designer and he was just there to make observations and to make a recommendation. He reached certain conclusions which are stated in his summary and which forms part of the court documents. Two other shafts were inspected at the site where they took the gearboxes off and he was witness to the specific inspections but the report was done by Mr. Gouws. Ultrasonic testing was done to determine any defects. He could not say what the defects were because the probe shows that there is no continuity of weld material. He does not agree with the defendant's contention that because of the angle that was too small and because of the fact that it was not a full penetration weld that this led to its failure. He stated that you can still get a good weld without the full penetration weld. He agreed with the reports of Mr Klima and Mr Kometas because they looked at a very small portion of the weld. He did not dispute that there were sections where the weld was good. He stated that if you look at the rest of the weld there are imperfections.

On a query by the court he stated that with a k-prep design you will not get a full penetration weld because of the 10 mm landing. He stated

further that it was lack of fusion which led to the failures which is indicated in the machining marks in the parent material.

Under cross-examination by counsel for the defendant he stated that he was not qualified to express an opinion on aspects relating to design and gave his opinion and recommendations based on his experience. He recommended a full penetration weld as an x-ray could be performed of the weld to determine the extent of any imperfections. In the absence of a full penetration weld, the extent of the imperfections cannot be conclusively determined. He stated that an ultrasonic examination cannot determine the cause of defects and that a full penetration weld was less likely to fail then the weld in question. For a full penetration weld, a 10 mm landing is not appropriate and he recommended that the angle be changed to an angle of 45° as a reasonable welder would find it difficult to manipulate the welding rod at an angle of 30°. There is no such thing as an absolutely perfect weld or a weld which is absolutely free of imperfections. Where the drawing refers to all welds to be continuous and free of imperfections with regard to the reasonable welder this can only mean as is allowed by industry standards and as is possible in complying with the contents of the drawing. He confirmed that the QCP is used throughout the course of the defendant

manufacturing the equipment and it is customary for the QCP to be signed off by both the plaintiff and the defendant as this ensures that it is a binding document. If any milestone in the QCP is signed off on behalf of the plaintiff, the defendant is entitled to accept that the plaintiff is satisfied with the work conducted in accordance with that milestone. He knows Mr Bosman personally and if Mr Bosman's signature is present in signing off a particular milestone in the QCP, he is satisfied that that milestone has been coupled with. The milestones in the QCP are decided when the QCP is drawn up and are signed off once that milestone has been coupled with. He confirmed that the presence of Mr Bosman's signature on the QCP at line 3.6 indicated that the plaintiff accepted that the work conducted by the defendant was as per the drawing. He stated that the purpose of an ultrasonic examination is to verify that there are defects and not to determine the cause of such defects and the purpose of a metallurgical examination is to determine the cause of the defects. He is not qualified to state that the findings of Mr Kometas are incorrect and does not dispute the findings by Mr Klima and Mr Kometas. Further he cannot disagree with the conclusions made by Mr Kometas and Mr Klima but states that, that applies only in respect of the sample which they inspected. He agrees that in the absence of a metallurgical inspection on the balance of the equipment, the plaintiff cannot prove in respect of the

balance of the equipment, the failure in the shafts was not caused by the design. If it is established that the lack of fusion and penetration was as a result of the design, the plaintiff does not have a case.

The evidence of Mr Kotze, briefly, was that in September 2005 he was employed by the plaintiff as a Projects Co-ordinator and was tasked with executing all the orders for the equipment that had to be built. He was not involved in the execution or negotiation of the contract between the parties but in January 2007, got involved with the replacement of the equipment in Ghana. He was involved in sending Mr Van Wyk to Ghana to investigate what the problem was with the failure of the shafts. After he received the report from Mr Van Wyk he obtained the PQR from the defendant. The plaintiff had come to the conclusion that the equipment was not manufactured to standard and opted to place an order with a different supplier to get the replacement equipment. He stated that a summary of all the costs incurred by the plaintiff for the replacement equipment is reflected on annexure "X" to the minutes of the pre-trial conference and verified the items thereon and the amounts.

Under cross-examination by counsel for the defendant he stated that he was not the author of annexure "X" which was compiled using the data procured by another individual who was not called as a witness. He conceded that he was unable to verify that those costs reflected in annexure "X" did not correspond to any supporting documentation in the bundle. He also conceded that the items contained in annexure "X" which make up the plaintiff's claim was not all related to the reasonable cost of the replacement of the shafts. He stated that the only item which relates in his view to the actual cost of replacement of the shafts was item 7 in a total amount of R962 089,00 (excluding VAT) and the other items expressed in annexure "X" constitute consequential losses. He further conceded that it was impossible to tell whether the shafts which were originally contended by the plaintiff to constitute the replacement shafts were, in fact, the replacement shafts as he was not sure which of the shafts came from DB Thermal and which of them came from Eastern Engineering. He further conceded that what Eastern Engineering effectively then charged for the reasonable cost of replacing ten (10) shafts was an amount of R314 440,00.

The evidence of Mr AT Cordozo was to the effect that he was the Construction Manager at that point in time responsible for the construction

and commissioning of the plant. He requested the plaintiff to speed up the process of providing replacement shafts for the shafts that have failed during the commissioning stage of the project. He expressed an opinion that poor fabrication techniques had been used to weld and manufacture the shafts that have failed and which opinion was objected to by counsel for the defendant as he has not qualified as an expert in this matter. He stated that a number of shafts were repaired by his company and re-instated back into operation. He stated that he knew that shafts which had not failed were going to fail because he had seen the crack propagation.

Under cross-examination by counsel for the defendant, he stated that he became aware of the drawings after the damages had taken place. He confirmed that, in his attempt to repair the shafts he used a 60° angle to grind out the weld deposit and at least ten (10) of the shafts were operational. He did not inform the defendant that in the event of the shafts failing, new shafts would have to be put in on an expedited basis as a matter of urgency.

That was the case for the plaintiff.

Mr A Wehmayer was the first witness to testify on behalf of the defendant. His evidence, briefly, was that he is employed by Eastern Engineering as an engineer and has been there for 28 years. This company was approached by the plaintiff to provide 17 replacement shafts, some of which were to be used at the Bogoso mine in Ghana. He was told that the shafts which he was to manufacture were to be used as replacement shafts in respect of ten (10) shafts that had been previously manufactured by the defendant and which had failed. His company was given specific instructions regarding the work to be carried out and was given a drawing which contained the design in accordance with which the work was to be conducted. The drawing forms part of the court bundle and provides for a full penetration weld, a 3 mm landing and an angle of 45°. When he did ultrasonic testing he found that there were shortcomings in the weld in some of the shafts. He stated that when a welder is tasked to manufacture shafts like this, he is not knowledgeable in the processes and procedures involved in the agitation of biox slurry. He stated that what the words "continuous and free of imperfections" means for his drawing is different to what it means for the defendants drawing as the defendant's drawing dictates a 10 mm landing and not a full penetration weld. He sated that it was impossible for the defendant to remove any hairline cracks, slag

inclusions or other imperfections whereas in the drawings that was given to him there was a full penetration weld so he could remove those imperfections.

Under cross-examination from counsel for the plaintiff, he stated that there are other advantages of a full penetration weld and not only that it is easier to test the quality of the welding because you can use x-rays as opposed to ultrasonic testing. He stated they were not told that those manufacture of the shafts was for the biox filters but they knew that it was for agitators. Further he stated that a welder is not knowledgeable in the process of agitating biox slurry.

The second witness to testify on behalf of the defendant was Mr DP Bosman. His evidence briefly was that he is presently a Quality Assurance Manager employed by the defendant. During September 2005 he was contracted to both the plaintiff and the defendant. He is aware of the project which forms the subject matter of this litigation. He was contracted to perform quality control work for both parties. The quality control plan ("QCP") is a document where steps are laid out for fabrication of various parts. The QCP is referred to as a "living document" which means that the

document is utilised throughout the performance of the work and sets out particular milestones within the work and ensures in certain instances that the next milestone is not proceeded with until the previous milestone has been signed off and approved by him as representative of the plaintiff. He was an independent quality manager to ensure that the defendant was doing its work. After the welding has been done, the machining of the shaft will take place as per the drawing. The end product will be the machining of the complete shaft with a flange welded to it. After everything has been completed on the shaft, the welding and the machining, a final inspection is done and the shaft is released as fabricated. The plaintiff was aware of the state of affairs and never raised any complaints regarding the quality of the work or the fabrication process.

Under cross-examination by counsel for the plaintiff, he stated that he received a combined salary of R28 000-00 per month from both parties, the plaintiff paying approximately two-thirds of that amount. His tasks on behalf of the plaintiff were to ensure that the defendant complied with quality control procedures. He did not agree with the proposition that, when he acted for the plaintiff, they would prefer him to be stricter and whereas the defendant would prefer him to be lenient. He stated that at the

end of the day, he would be responsible for the quality of the product. He did not do an ultrasonic testing, as he did not deem it necessary because of the lack of fusion in the weld and that repeated reflections will be coming from that interface, although the QCP specified an ultrasonic test to be done. He stated that the drawings show lack of fusion and prescribes a 10 mm landing, so there is not going to be a full penetration weld. He did not agree with the proposition that he deliberately allowed the defendant to compromise the quality of its workmanship so as to be able to save costs.

The third witness to testify on behalf of the defendant was Mr C Felipe. He testified that he is presently employed by the defendant as an Engineering Co-ordinator. During September 2005 he was employed by the plaintiff as an Engineering Manager. He was involved in the project when he got all the drawings from overseas. He confirmed that the reference in paragraph 3 of the particulars of claim to the plaintiff's representative in concluding the contract is a reference to him. When the job went out to tender, they used the drawing which had a forging instead of a welded flange. With regard to the comment by Mr Derham that this particular design was utilized by the plaintiff in various parts of the world and has not led to a failure, he disagreed with the comment and stated that

this has never worked on that particular drive that they were doing. Although the plaintiff does use this particular design in other places around the world, it does not use it on shafts of this nature where there is a gearbox. This design was never utilised before this instance for shafts of this size where a gearbox was present. The internationally used design for the manufacture of shafts which is supplied by the plaintiff to fabricators stipulates a forging and there are no welds.

Under cross-examination by counsel for the plaintiff he stated that this was the first project of this size that he was involved in. He further stated that the defendant was awarded the tender because they previously did work for the plaintiff and they were good at what they were doing. The defendants quote was not the lowest quote.

On re-examination he stated that it is basically the defendant and Mr Danie Bosman on behalf of the plaintiff who was involved in having consideration of the QCP.

The fourth witness to testify on behalf of the defendant was Mr LG Kometas. He was an expert witness and testified briefly that he is a

qualified metallurgist and runs his own company and consults in the field of metallurgy on a broad spectrum also specialising in welding and the metallurgy of welding. He has worked in this industry for approximately 29 years. From 2002 he established his existing company Metfocus Metallurgical Services which is an independent organisation. He had done work for both the plaintiff and the defendant previously. In September 2007 he was requested by Mr R Klima to conduct a metallurgical investigation into the likely cause of failure of a welded flange or shaft assembly from a site in Ghana. He received a sample of the failed flange or shaft and proceeded to conduct his metallurgical investigations for which he produced a metallurgical report. There were in fact two reports, a preliminary report and a final report. The only difference between the two reports is that there was some outstanding information and some chemical analysis results outstanding and basically the conclusions and recommendations are the same. The reports form part of the court documentation. Mr Kometas provided the court with a brief synopsis of what the metallurgical reports entail and also explained the steps taken by him in conducting his investigation. The conclusions of the investigations conducted by Mr Kometas were that the welding work conducted by the defendant did not contain any defective workmanship. The failure in the

weld was caused by the design which was given by the plaintiff to the defendant. The welding work performed by the defendant was within acceptable standards. Where you have a landing area of 10 mm and a welding angle of 30°, a full penetration weld is impossible. If that is considered together with the statement that the weld must be continuous and free from imperfections, this can only mean that the weld must be continuous and free of imperfections to such an extent as is possible given that the landing is 10 mm and the angle is 30°. There is no such thing as a weld which is absolutely free of imperfections or free from defects. That is why industry norms and procedures allow for defects or imperfections to a certain extent. Based on his assessment of the welding work carried out, all work done by the defendant was within these acceptable standards. He would suggest that the landing be changed to a maximum of 3 mm and that the angle is changed to a minimum of 45°. Based on his knowledge and experience, he confirmed that the presence of any of the plaintiff's complaints was not as a result of the workmanship of the defendant, but rather as a result of the design. This was corroborated by the fact that neither Mr Derham or Mr Van Wyk conducted any metallurgical examination on the failed shafts, but rather conducted merely a visual inspection and as such they are unable to verify the point at which any

cracks initiated and would therefore be unaware that the cracks propagated from the centre of the shafts outwards. Without conducting a metallurgical inspection one is unable to tell that the cracks initiated from the landing and propagated outwards. Only through a metallurgical inspection can you acquire a meaningful understanding of the cause of the failure. The fact that the crack initiated at the landing and propagated outwards indicates that the landing was the "crack initiator" which means that the landing was the cause of the crack. The defects were therefore caused by the design and not by the workmanship of the defendant and it would not have been possible for the defendant, given the problems with the design, to provide a weld which was continuous and free of imperfections. Further, he stated that in the sample he examined he did not find any porosity or slag. He stated further that Mr Derham could not from his visual inspection, determine the cause of the failure of the shafts and does not agree with Mr Derham's statement that poor welding resulted in a complete lack of fusion.

Under cross-examination by counsel for the plaintiff he stated that he includes, as a general condition in his reports, that he will not be responsible for any consequential loss or damage or injury suffered by any person from any cause whatsoever and whether occasioned by his neglect

or otherwise. He received the sample from Mr McMillan and he does not know who selected the sample. He was satisfied with the drawings and he was satisfied with the QCP. He examined a section that had four (4) holes in it and constituted approximately 17% of the flange. The rest of the flange would have shown the same shortcomings as the one that he examined. He had gone beyond a visual examination. The other advantages of having a full penetration weld is that you have a monolithic weld and you do not have a built-in defect. If there was not a 10 mm landing there would be no failure and there would not be bad welding. A full penetration weld prevents problems at the root. A 10 mm landing is a landing which is a potential crack that will grow.

If you have a full fusion you will not have a potential crack. He further stated that he did tell his advocate that the machining marks referred to by Mr Van Wyk were not machining marks but could be beach marks. He did not think that an ultrasonic testing would produce a meaningful result if there was a defect.

On re-examination he stated that the purpose of a metallurgical inspection is to determine the root cause of the failure and he found that the

landing area, where the cracks initiated from and propagated was the cause of the failure.

The fifth witness to testify on behalf of the defendant was Mr RD Klima. He testified briefly, that he is the owner of a mechanical engineering company, namely Formstar Consulting and has been involved in the industry for approximately 41 years. He was instructed by the defendant to look at the drawing from a design point of view and as a welding engineer. He suggested to the defendant that a metallurgist should be involved to really establish the cause of the defect or failure of the shaft's and recommended Mr LG Kometas as he held a very high opinion of him. A sizable sample was obtained from Ghana, which weighed approximately 60 kg, and was handed to Mr Kometas by Mr McMillan, his colleague. He is fully aware of the report of Mr Kometas which he regards as absolute state of the art and he fully agrees therewith. He stated that the report establishes failure, fatigue fracture with a 10 mm landing of the partial penetration weld as a crack initiator. Micro photographs and hardness tests show normal and perfectly acceptable metallurgical structures of the weld metal depth. This conclusion of the investigations conducted by him was that it was highly unlikely that the welding work conducted by the

defendant was defective. The failures in the welds were caused by the design which was given by the plaintiff to the defendant and the welding work conducted by the defendant was within acceptable standards. A full penetration weld is not possible where there is a landing area of 10 mm and a welding angle of 30°. With regard to the evidence of Mr Wehmayer, he commended the change in the design to a full penetration weld and an angle change from 30° to 45°. He stated that it is normal practise to conduct a visual examination but to determine the cause of a failure you would have to look in depth into the failure. He agreed with Mr Van Wyk's statement that the weld preparation from the flange onto the shaft is too small for sufficient penetration but disagrees with his view as to the cause of the lack of fusion and penetration. He disagrees with the conclusions of Mr Derham and Mr Van Wyk that there was defective workmanship on behalf of the defendant. He stated that with complete lack of fusion and penetration you would not have been able to turn the assembly around once because it would just rotate empty. With regard to the statements by Mr Derham and Mr Van Wyk that there was defective workmanship in that there was excessive porosity and slag, he stated that there is no such thing as a weld which is absolutely free of imperfections or free from defects and that excessive porosity and slag was not the cause of the failure of the shafts.

Under cross-examination by counsel for the defendant, he stated that the sample used is representative of the cracked weld because if you have a mode of failure in a constructed and a manufactured part, then it is absolutely unlikely that, that mode of failure does not take place in any other part. He further stated that the machining marks referred to by Mr Van Wyk could be fatigue marks and then it is a fatigue crack and not a lack of fusion. Further the three holes indicated on the photographs are not indicative of bad workmanship. Further an ultrasonic test on a non-failed item is not a way for determining the possible cause of failure but it can determine the presence of defects. In his view, the welding procedure was done in terms of the welding procedure governing the work. That was the case for the defendant.

It is clear from the evidence that the court is confronted with two irreconcilable versions. In a nutshell, the plaintiff's version is that the defendant failed to effect the work required in a proper and workmanlike manner which caused the shafts to fail. The defendant's version is that the failure was caused by a design fault and denies that it failed to effect the work required in a proper and un-workmanlike manner. The court must

assess the various witnesses' evidence relating to their credibility, reliability and the probabilities and make findings to determine whether the plaintiff has discharged the onus of proof.

With regard to the defective welding, the plaintiff presented the evidence of Mr Derham and Mr Van Wyk, both of whom averred that it was poor welding with lack of fusion that lead to the failure of the shafts. Mr Van Wyk alluded to photographs, including one which he stated, displayed machining marks which indicated the lack of fusion. Counsel for the plaintiff argued that it was not put to him that the marks were not machining marks but cracks which propagated from the root of the weld which was the effect of the evidence of Mr Klima. It was further argued by counsel for the plaintiff that Van Wyk's evidence that the ultrasonic testing done in his presence by Gouws on two of the other shafts also showed defects and was not challenged, and further that Derham's evidence was that the welding shown on exhibit "B" at the end of the shafts showed the same characteristics deposed to by Van Wyk. Counsel for the plaintiff submitted that this evidence, seen as a whole, establishes that there was defective welding.

The defendant's case on this aspect rests on the evidence of its two expert witnesses, Mr Kometas and Mr Klima. Their opinions and conclusions were that the welding work conducted by the defendant did not contain any defective workmanship and the failures in the welds were caused by the design which was given by the plaintiff to the defendant and that the welding work performed by the defendant was within acceptable standards.

It is clear from the evidence that Mr Kometas conducted a metallurgical investigation into the likely cause of the failure of the shafts and was provided with a sample. Issues have been raised in argument by counsel for the plaintiff with regard to the obtaining of the sample and the size of the sample, which I will deal with later in my judgment. It is common cause that it is only through a metallurgical inspection that one can acquire a meaningful understanding of the cause of the defects. Without conducting a metallurgical inspection one is unable to say that the cracks initiated from the landing and propagated onwards. The evidence of Mr Kometas was that the crack initiated at the landing and propagated outwards indicating that the landing was the crack initiator which means that the landing was the cause of the crack and the defects were caused by the design and not by the

workmanship of the defendant. This was corroborated by the fact that neither Mr Derham nor Mr Van Wyk conducted any metallurgical examination on the failed shafts but merely conducted a visual inspection and as such they are unable to verify the point at which any cracks initiated and would therefore be unaware that the cracks initiated from the centre of the shafts outwards. The plaintiff had ample opportunity to obtain the services of an expert to conduct a metallurgical examination but failed to do so at its peril.

It is common cause that there was a lack of fusion and penetration between the welds due to the landing. The issue is whether that lack of fusion and penetration was caused by the design inherent in the drawings provided by the plaintiff to the defendant or whether it occurred as a result of defective workmanship. The allegation by Mr Derham that there was defective workmanship because of a complete lack of fusion and penetration by a mere visual inspection given the dirt and damage to the shafts during that time, did not contribute meaningfully as to the cause of the failure of the shafts. Mr Derham has accepted that a visual inspection merely verifies the presence of defects but does not determine the cause of such defects.

Mr Van Wyk conceded that the purpose of an ultrasonic examination is to determine defects and not to determine the cause of such defects and further that the purpose of a metallurgical examination is to determine the cause of the defects. He also stated that he is not qualified to express an opinion on aspects relating to design. As such Mr Van Wyk is unable or not qualified to state that the findings by Mr Kometas are incorrect.

Mr Van Wyk conceded that a full penetration weld was less likely to fail than the weld in question. He stated that for a full penetration weld a 10 mm landing is not appropriate and he recommended that the angle be changed to an angle of 45° as a reasonable welder would find it difficult to manipulate the welding rod at an angle of 30°. He stated that there is no such thing as an absolutely perfect weld or a weld which is absolutely free of imperfections and conceded further that industry norms and procedures allow for defects or imperfections to a certain extent. This evidence of Mr Van Wyk is reconcilable with the evidence of Mr Kometas and Mr Klima who suggested that the landing be changed to a minimum of 3 mm and that the angle be changed to a minimum of 45°.

It is also clear from the evidence of Mr Van Wyk that the plaintiff did approve the workmanship of the defendant by signing off the QCP through Mr Bosman who was a reputable and independent quality manager. The contention by counsel for the plaintiff that Mr Bosman was in a compromised situation when he supervised the QCP for the shafts is in my view untenable as not one of the plaintiff's witnesses at any stage suggested that he acted in a manner that favoured the defendant to the detriment of the plaintiff or acted improperly in any way. Mr Bosman was a good witness and did not strike the court as a person who would compromise his position and still remain in his field for such a long period.

As indicated earlier, counsel for plaintiff in argument raised an issue that Zechner substituted another piece of flange which he brought from Ghana and as such it is questionable whether the results of Mr Kometa's examination would have any probative value whatsoever in the absence of direct evidence as to the origin of the sample he examined. This argument is indeed fanciful in the extreme as in my view it is highly improbable that Zechner would go all the way to Ghana to substitute another piece of flange. Further, this issue was not raised anywhere on the papers or by any of the plaintiff's witnesses. The further issue raised by counsel for the plaintiff

was that the sample examined was too small and is not reflective of the equipment. The plaintiff's witness Mr Derham provided no scientific basis for suggesting that such observations are not present on the balance of the equipment. Mr Kometas and Mr Klima confirmed that the sample was sufficiently reflective of the equipment as a whole. Mr Van Wyk conceded that in the absence of a metallurgical inspection or examination on the balance of the equipment, the plaintiff cannot prove the failure of the shafts was not caused by the design. Mr Derham's contention that the same design was used elsewhere without failure is countered by the evidence of Mr Felipe who stated that this design was never used before this instance for shafts of this size where a gearbox was present. Mr Derham was not a good witness. He did not strike the court as being an expert witness who is sufficiently objective. He refused to accept that the only way to determine the cause of the failure in the welds was through a metallurgical inspection even though the plaintiff's other witness Mr Van Wyk quite readily conceded that the only way to determine the true cause of the failure of the shafts was through a metallurgical examination. He further was not prepared to concede that the design was changed to a full penetration weld when the replacement shafts were ordered despite the clear evidence on the papers and the evidence of Mr Wehmeyer. The probability that Mr Derham

was able to contribute to any meaningful opinion as to the cause of the failure of the shafts is in my view minimal. Further with regard to the reliability of Mr Derham as a witness it is clear from the evidence that on two separate occasions of having inspected the shafts, in the first instance, he was not able to detect any defective workmanship whilst on the second occasion, through all the dirt and grime, was able to concluded that there was defective workmanship. In view thereof, the conclusions of Mr Derham cannot be accepted.

Mr Kometas and Mr Klima were good witnesses. Their evidence was not discredited in any way and on the probabilities their evidence must be accepted. Mr Klima contended that the failure of all ten (10) shafts due to poor workmanship is improbable and that a poor design (the 10 mm landing and the 30° angle) is more probably the cause of the failure of the shafts. I fully agree with the contentions of Mr Klima as I am of the view that a welder may have a bad day when welding a shaft, but it is highly improbable that he will have a bad day everyday when he welds the shafts.

Although it was Mr Cordozo's evidence that he grinded out the weld deposit and successfully re-welded three (3) shafts at the 30° angle with the

landing in tact, he was unable to state how long the welds endured. This however does not prove that the design was not faulty.

I am satisfied that the defendant has established that the cause of the failure of the shafts was the design and not the defective workmanship of the defendant and as such it would not have been possible for the defendant, given the problems with the design, to provide a weld which was continuous and free of imperfections.

In view of the concession made by counsel for the plaintiff at the commencement of this trial that if it is established that it was because of the design that these welds of the flanges on to the shafts failed, then the plaintiff does not have a case, I do not deem it necessary to deal extensively with the aspect of the plaintiff's claim for damages, suffice to state that it is clear, on the pleadings that there is no allegation by the plaintiff that the defendant was knowledgeable in the process of agitating biox slurry and there was no evidence which was led by the plaintiff to suggest that the defendant was knowledgeable in the process of agitating biox slurry and that the contract between the parties was concluded on the basis of special facts and circumstances which would give rise to a claim for special

damages in the form of consequential losses. Without such allegations or evidence the plaintiff's claim for consequential damages cannot succeed.

See: *Lavery & Co Ltd v Jungheinrich* 1931 AD p172.

The plaintiff has failed to discharge its onus that the defendant's defective workmanship was the cause of the failure of the shafts and therefore the plaintiff s damages.

In the result, I make the following order:

The plaintiffs claim against the defendant is dismissed with costs.

SS OMAR

ACTING JUDGE OF THE HIGH COURT, PRETORIA

FOR THE PLAINTIFF: ADV. BEATON

INSTRUCTED BY:

FOR THE DEFENDANT: ADV. MAHONE

INSTRUCTED BY: