

In the High Court of South Africa
KwaZulu-Natal Local Division, Durban.

Case No: 11896/2009

In the matter between:

Rennies Distribution Services (Pty) Ltd

Plaintiff

And

Old Co-Fire Control Systems (Pty) Ltd

Defendant

Judgment

Lopes J

[1] The plaintiff in this matter, Rennies Distribution Services (Pty) Ltd ('Rennies'), sues as the cessionary of a claim for damages which vested in Mondi Ltd. The defendant is alleged to have been responsible for the damages sustained by Mondi Ltd as a result of the defendant's negligent installation of a water pipe at 30 Paisley Road, Jacobs, KwaZulu-Natal ('the premises').

[2] During August 2006, the defendant, as a sub-contractor, installed a water pipe in a warehouse at the premises. The water pipe was intended to be a feeder pipe to an overhead sprinkler system in an adjoining warehouse which was under construction. The water pipe ran across the length of the warehouse immediately below the roof trusses. It was secured to the roof trusses by way of G-clamps ('jockey clamps') which were screwed onto the upper flange of the I-beam shaped trusses, and supported by a threaded rod on the end of which was a steel strap surrounding the water pipe. The water pipe was connected to the water supply under approximately five bars of pressure. The pipe was laid in lengths of approximately six metres each, and they were connected end-to-end by what are called 'Klambon' clamps (or joints or fittings).

[3] At about midnight on the 25th August 2006, the pipe broke apart resulting in thousands of litres of water being released onto a consignment of paper stored in the warehouse, and which belonged to Mondi Ltd. The resulting water damage occasioned the damage suffered by Mondi for which the plaintiff sues in this action as cessionary.

[4] At the time that the pipe failed, it had not yet been connected to the sprinkler system which was being constructed in an adjoining warehouse. At that stage the pipe ran across the width of the warehouse and terminated in a flange at or near the adjoining warehouse under construction. The water pipe was, however, under pressure.

[5] I was required to determine, as a first issue, the cause of the breakage of the pipe and whether the defendant was liable in law for the consequences thereof. At the outset of the trial, I accordingly made an order by consent between the parties, and in terms of Rule 33(4), separating the issues of quantum and liability, with the issue of liability to be determined as a first issue.

[6] On the night of the incident, the personnel who were present at the premises were three security guards employed by Protea Security Services, one of whom was Brandon Singh, a senior security officer, and another Valithum Adikanny (also known as Sagren). Sagren was employed as a forklift driver. His function was to load reels of paper taken from the warehouse onto trucks belonging to Springbok Trucking Services, which would arrive from time to time to load the paper, and take it to the Mondi mill on the KwaZulu-Natal South Coast. The driver of the Springbok Trucking Services truck, ('the truck') was also present.

[7] The following witnesses gave evidence for the plaintiff:

- (a) Sagren, who was the only forklift driver on duty that night and who was responsible for removing paper reels from the warehouse and loading them onto the truck;
- (b) Moonsamy Padayachee (also known as 'Dan'), the driver employed by Springbok Trucking Services who arrived at the premises some time before midnight in order to uplift a load of reels of paper;

- (c) Rishi Sindulal, a security officer employed by Protea Security, who was in charge of security on the site. He was called to the site after the water pipe failed;
- (d) Dayalan Moodley (also known as 'Neville Moodley'), the terminal manager at the site who was also called out to the premises after the water pipe failed;
- (e) Andrew Richard Osborn, a loss adjustor who inspected the premises after the incident;
- (f) Jens Jakobsen, a fire protection consultant who advised Rennie's as an expert on the quality of the installation of the water pipe;
- (g) the late Mr Gary Reabow, an engineer who investigated the cause of the water pipe failing;
- (h) Professor Graham Smith, a professor in mechanical and civil engineering at the University of KwaZulu-Natal.

[8] It is perhaps easiest to deal with the evidence of the witnesses in the order in which they were working on the premises.

[9] Sagren Adikanny testified that he was employed by Afripack Packaging as a materials handler, or fork-lift driver. At the time of the incident, he had been working for a labour broker at the Paisley Road warehouse for approximately three years. He drove a forklift in the warehouse loading trucks, and he moved reels of paper in and out of the warehouse. In order to do so he drove different types of what he

referred to as 'hysters'. One was a roll clamp hyster which was able to lift reels of paper and could carry a number of them on the front of the roll clamp. He also drove forklifts which were used to lift pallets. ('Forklifts' and 'hysters' were referred to interchangeably throughout the trial).

[10] On the night in question he came on duty at approximately 7pm. No other employee was working on the site doing what he did. He was given a schedule of tasks, including to remove from the warehouse a number of reels of paper which were due to be loaded onto the truck to be delivered to Mondi. In preparation for the truck's arrival he removed a number of the reels of paper from the warehouse and stacked them in what he referred to as a 'pre-marshalling area'. He was driving a four ton 'short mast' roll-clamp machine, which was used when it was necessary to be able to remove reels of paper from a container.

[11] Sagren had not yet completed the task of taking the reels of paper to the pre-marshalling area when the truck driven by Dan Padayachee arrived. Sagren waited for Dan Padayachee to open the tarpaulin and then started loading the reels onto the truck from the pre-marshalling area. At that stage he still had to uplift more reels from the inside of the warehouse.

[12] Whilst Sagren was loading the truck in the pre-marshalling area, he heard a loud bang. He switched off his hyster and walked towards the warehouse. As he got to the entrance he saw water gushing out under force from the water pipe

approximately five metres from the entrance to the warehouse and above him and to the left. At that stage Dan Padayachee was standing in the vicinity of the entrance to the warehouse and the security guards arrived. The water was gushing out onto the reels of paper and spreading across the floor of the warehouse. Sagren was emphatic in his evidence that at no stage was he, or the equipment he was using, in the vicinity of the water pipe at the time that it broke. Neither he nor his equipment became wet as a result of the broken water pipe.

[13] Sagren testified that when it was necessary for him to remove a roll of paper from the stack, he would drive into the warehouse, use the mechanism on the front of the roll clamp to lift the reel of paper onto the mast and then he would reverse the roll clamp out of the warehouse to the pre-marshalling area. Because of the height of the reels of paper loaded onto the front of the roll clamp, it was not possible to see past them if trying to drive forward, and that was why the drivers reversed out of the stack once they had loaded the reels of paper onto the roll clamp. Sagren maintained that a 'short mast' roll clamp did not allow for as many reels to be stacked on the front of it as did a 'high mast' roll clamp. He also said that the level at which the pipe was hanging was above the level of the top of the roller door entrance to the warehouse.

[14] Sagren also testified that his practice was that, when lifting a reel of paper, the lowest reel would be carried approximately 30 to 40 millimetres from the ground. The purpose in so doing was that if anything happened whilst the load was being carried, it was close to the ground and less likely to incur edge damage if it fell from

the roll clamp. A further reason why that method of operation used was to carry the reel of paper close to the ground was because if it was carried high up in the mast, it would unbalance the machine. This could result in the machine toppling over and there was the possibility of injury to personnel.

[15] When he saw the water pouring out of the broken water pipe, Sagren and the security guards on the premises endeavoured to find the shut off valve. He also went to the office to telephone Neville Moodley and Devon Naidoo who were more senior employees in the management of the site. The fire-brigade arrived a short while later, and the water was shut-off. Sagren could not remember who had done so

[16] It was suggested to Sagren in cross-examination that the cause of the pipe breaking is that it was struck by a hyster and/or a reel of paper on a hyster as it proceeded towards the door of the warehouse. Sagren was adamant that at no stage on the night in question did any equipment which he was driving, or of which he was in control, knock into the pipe or collide with it. He said that if his hyster had collided with anything, he would have been aware of it because he would have felt the bump. He also said that if he had collided with the pipe he would have been soaked and that was not the case. As a further factor negating the possibility of his having damaged the pipe, Sagren said that he was loading in the pre-marshalling area when the pipe failed. He also pointed out that the area where he was working to carry reels of paper from the warehouse to the pre-marshalling area was nowhere near the area where the pipe broke. Sagren also denied the suggestion that one

Douglas, a fellow forklift driver was on duty that night. He was supposed to have arrived for work but did not do so.

[17] Moonsamy Padayachee (also known as 'Dan') testified that he was self-employed, running a pest-control company. He had previously been a driver for Springbok Trucking Services and had arrived at the premises on the night in question and parked the truck in the loading area. He said that at that stage Sagren was still fetching paper reels from the warehouse and bringing them out to stack them for loading onto his truck. The reels which were already stacked outside the warehouse when the truck arrived were loaded first. Thereafter Sagren fetched the balance from the warehouse. Mr Padayachee testified that he was standing near to the entrance of the warehouse doorway, and did so because he wanted to check the reels as they came out of the warehouse for edge damage. Whilst standing there he heard what he described as an explosion and saw the broken water pipe to his left approximately twelve metres away. He said although the water was coming out at force he did not get wet because he stepped away. He said that at that time the hyster driven by Sagren was nowhere near him and not in his field of vision. He said if it had been there he would have seen it.

[18] Rishi Sindulal was, at the time of the incident, employed by Protea Security and responsible for security at the site. He said that at the time of the incident the site senior, Brandon Singh, was present on the premises together with two security guards controlling access to the site, and one roving security guard. He was phoned by Brandon Singh and told a pipe had burst. This was somewhere between midnight

and 1am, and he had been sleeping when he got the call. Mr Sindulal said that it took him approximately half an hour to get to the site where he saw the truck and the fire department present. The water was gushing out of the broken pipe.

[19] He tried to assist the fire department in searching for the shut-off valve, and eventually they had to contact the Ethekeeni Municipality water department who came and shut off the valve. At the stage that he arrived at the site and was making initial investigations there was no suggestion that the pipe had been struck by the roll clamp or its cargo. He said that neither Sagren, nor his machine, nor the security officers showed any sign of having become wet from the incident. Sagren had told him that at the time of the incident he was nowhere near the water pipe which broke. He was in a different section of the warehouse approximately 100 to 150 metres away.

[20] Dayalan Moodley (also known as 'Neville Moodley') testified that he was self-employed, running a logistics company. He had worked for Rennies at the time of the incident as terminal manager at the site. The premises were owned by J T Ross & Co and Rennies leased the premises from them. The warehouse was used for the storage of paper for Mondi Ltd and consisted mostly of what was referred to as 'cutter reels' which were cut up into A4 size paper sheets. The paper reels were described as WIP or 'work in progress' reels.

[21] Mr Moodley confirmed that at the time of the incident Sagren was employed there via a labour broker, and that on the night in question he had worked on his own at the site as the storeroom operator. At approximately midnight Mr Moodley received a phone call from Sagren and he went to the site which was approximately nine kilometres away. It took him approximately ten to fifteen minutes to get to the site. When he got there he saw the security guards and Sagren running around looking for the shut-off valve to stop the water coming out of the water pipe. He phoned the fire brigade at 12.17pm, a few minutes after arriving.

[22] The fire brigade arrived approximately ten minutes later, but were also unable to locate the shut-off valve. Eventually the Ethekwini Municipality water department was contacted to do so. Whilst at the scene Mr Moodley made a cellphone video of the water emerging from the water pipe. The water was coming out at force and falling onto the reels of paper in the warehouse. He said that neither Sagren nor his machine were wet and if they were he would have noticed. He had been told by Sagren, the truck driver, and the security guard that they were outside the warehouse when the pipe failed. Sagren was ready to load from the pre-marshalling area when they heard a bang and went to investigate. The cutter reels which were being loaded onto the truck were located on the far side of the warehouse.

[23] In cross-examination Mr Moodley said that he did not see any portion of the pipe which had fallen onto the floor of the warehouse. He could not recall that a section of the pipe had broken off and fallen onto the floor. He repeated that the pipe had split, and both sides of it were still hanging in the hangers. When asked

why he had taken note of whether Sagren or his equipment was wet, he said that it had been part of his investigation to determine what had caused the incident. He expressed it as being part of the protocol to understand whether the hyster had been involved in the damage or whether it had been a maintenance issue. He said Sagren had been the only employee on the premises. Mr Moodley further said in cross-examination that no reels of paper had been taken from that side of the warehouse.

[24] Andrew Richard Osborn testified that he was a loss adjustor in the employ of Cunningham-Lindsay, and his firm was asked to investigate the circumstances of the burst pipe. Another employee of the loss adjustors, Craig Smith, had visited the site on Saturday 26th August together with the risk manager of Rennies, one Ms Ingle. On the Monday Mr Osborn was asked to assist as manager of the region and the most senior loss adjustor. He familiarised himself with the layout of the premises and inspected the water pipe and reels of paper, and asked to speak to the employees who were present on the evening in question. He spoke to Sagren because he had suspected that the forklift driver had knocked into the pipe causing it to break. Having questioned Sagren, he accepted his explanation and focussed on the pipes and the manner in which they were secured. He described the manner in which they were secured as setting off 'alarm bells', because the pipes were not secured where he would have expected them to be. He measured the pipes which were approximately six metres long and said that he would have expected them to be secured close to either end and not predominantly in the middle. He said that most of the hangers which supported the pipe below the roof trusses were allocated in the middle of each length of pipe rather than towards the ends. He then contacted

Gary Reabow to assist in the investigation. He said that he did not see the missing section of pipe.

[25] Jens Jakobsen testified that he was a fire protection consultant who travelled throughout Africa checking on auto sprinkler fire protection installations. His primary task was to ensure compliance with the regulations and good business practice for fire prevention, and dealing with it when it occurred. He said that there were two systems in existence, the ASIB rules (Automatic Sprinkler Bureau (Pty) Ltd) and the SABS rules (the South African Bureau of Standards). Either was regarded as acceptable to insurers of premises at which sprinkler systems were installed, provided that the installation was in accordance with those rules.

[26] Mr Jakobsen testified that if correctly designed and installed, sprinkler systems had a very high reliability, with a very low probability of failure. Once a system was installed, it would be approved by the building control officer, and the recorded certification on the plans would be accepted as being 'To ASIB' requirements. A properly installed and certified sprinkler system would lead to insurance rebates. The National Building Regulations referred to the SABS regulations, with regard to the installation of sprinkler systems, but it appears that those rules are interchangeable with the ASIB rules. Mr Jakobsen said that the rules had originated from fire laboratories in the United Kingdom and the United State of America where extensive testing had been done for every kind of product, and that the findings were encapsulated in the rules.

[27] The type of sprinkler system depended on how much water was needed, under what pressure, and for how long to prevent and/or extinguish a fire. He stated that adherence to the rules was very important because an independent determination of the necessary aspects of a sprinkler system was very difficult and expensive to determine on the site. He said that industry would go to the extent of changing a building if it was unsuitable for the application of the ASIB rules. He said that the importance of the ASIB system was that it worked well because all the elements of the system are included in it. The rules are regarded as having a standing in good science and engineering in the industry. Any person doing an installation in accordance with the ASIB rules had to be trained and certified by ASIB. ASIB laid down regulations governing the quality of materials and installation. There was also a process for ASIB certification at the end of the installation.

[28] Mr Jakobsen said the fact that there had been no certification at the time of the incident was not unusual because the installation had been done very recently prior to the failure, and it was not unusual for verification to be done after the warehouse was being used. In his view, and according to the report of the late Mr Gary Reabow, the spacing of the piping supports was not in accordance with the tenth edition of the ASIB rules.

[29] The late Mr Gary Reabow then testified that he was an engineer who was asked to investigate the failure of the pipe. Prior to proceeding to a site inspection,

he was told that the pipe had collapsed because it had been hit by a forklift truck. After viewing the pipe and the factory itself, he came to the conclusion that a forklift truck could not have struck the pipe. Mr Reabow examined the coupling which had parted when the pipe collapsed, and came to the conclusion that a lug on the Klambon clamp which was evidently bent, had been bent when the pipe fell and struck the ground. In his view a significant force would have been required to dislodge the clamps and cause the pipe to collapse. He could find no significant damage on the pipe indicating that it had been struck by a forklift truck. In saying this, he conceded that a paper reel may have struck the pipe, which paper reel was being conveyed by a forklift.

[30] Not satisfied that the forklift truck had caused the collapse of the pipe, Mr Reabow examined the clamps and the method of suspension. He was struck by the fact that there was only one suspension point per pipe on average. On his visit to the site he had found two damaged malleable cast-iron jockey clamps on the floor. They had both sheared off. At first he suspected that a clamp may have fractured because of a flaw in the casting. However, he had changed his view on finding the second fractured jockey clamp.

[31] Mr Reabow concluded that because of the manner in which the clamp was fastened onto the roof truss, the piping would have had to have been hit from the end and could not have been struck from the side (as it would have been had it been struck by a forklift). However, when considering an 'end-on' strike, he concluded that there was simply no room for a forklift truck to have been able to strike the piping on

the end of it. Mr Reabow accordingly reverted to looking at the jockey clamps and hangers and looking for indications on the pipe in order to ascertain the cause of the failure.

[32] Eventually Mr Reabow decided that he had to go back to the conclusion that a hanger had failed. The drawing from which the contractor had installed the equipment indicated that one hanger per roof truss should be installed. Mr Reabow was of the view that each pipe section, together with the water contained therein and the couplings joining them, would have the weight of approximately 355 kilograms.

[33] Mr Reabow had telephoned the suppliers of Electromould, the manufacturers of one of the jockey clamps which were used in the construction, and he was told that those jockey clamps had never been tested to determine the load at which they would fail. The safe load capability of the O-line and Cabstrut jockey clamps were 310 kilograms. He viewed any difference in the Electromould jockey clamp because of its slightly thinner material, as being negligible. In his view the jockey clamps were overloaded by approximately 50 kilograms per length of pipe. The overload would have been the difference between 360 to 400 kilograms less the safe load of 310 to 316 kilograms.

[34] Mr Reabow was also of the view that the pipe ran in a straight line across the warehouse, and at the end of the warehouse there was a 90 degree joint, a short length of pipe and another 90 degree joint to enable the pipe to feed through the wall

at the end of the warehouse and into the next building. He opined that if a sling holding the bends had adjusted itself that would have transferred a load down the pipe to one of the other joints. His view was that as the pipe bends, the pressure of the water inside the pipe would attempt to straighten the pipe out. For that reason wherever a pipe did a ninety degree turn, it should have been braced. This was according to Klambon, the manufacturer of the couplings which connected the various lengths of pipe. Mr Reabow could not find any guides or restraints or anchors securing the bends in the pipe. Mr Reabow was of the view that the incorrect hanging of the pipes, together with the lack of support on the bends and the fact that the supports themselves were not strong enough to support the load contributed to the failure and collapse of the pipe. He was unable to say whether any one of them would have had that effect or whether they all had that effect. His view was that no-one would ever know. He simply regarded them as having been poorly installed.

[35] Mr Reabow was of the view that the jockey clamps which were fixed to the upper flange of the trusses did not contribute to the failure of the pipe. This was despite the fact that they were fixed to trusses which were sloped at approximately eleven degrees. He saw this as undesirable, but did not think it had contributed to the failure.

[36] Mr Reabow was also of the view that the manufacturers of the jockey clamps had recommended the installation of a safety strap. That would have prevented the clamps from sliding off the roof trusses to which they were bolted. Mr Reabow was

told by the contractors that they were never used and were not available in South Africa. Mr Reabow thought there was a possibility that the movement of the main pipe could have been contained had the additional safety straps been used by the contractor in installation. Mr Reabow expressed the view that there were so many factors involved that the possibility of an accumulation of all of them could have been the cause of the pipe coming down.

[37] Mr Reabow described how the Klambon clamps worked. There was a groove at the end of each pipe with a rubber ring in the groove. The clamp is in two halves and bolted down onto the groove. If fitted correctly there was very little possibility that the joints could come apart under pressure. However, if a clamp was skewed across a groove it would not have the strength which it should have. He regarded that as another possibility of failure, which he had discounted because he could not find any leaks having taken place, and there had been no reports of any leaks prior to the failure. Had the clamps not been correctly installed, he would have expected leakage to have taken place over the time during which the pipe was installed, which was about five days prior to the failure. Mr Reabow also drew attention to the fact that when new pipes were re-installed after the failure, two suspension points were used per section of pipe, instead of the one which had been previously used.

[38] Mr Reabow was also of the view that the installation had been incorrectly done because the height of the pipe was below the level of the top of the doorway. When told that that was in contradiction to what the other witnesses had said, he recalled that he had not measured the height of the pipe and the height of the

doorway but it was merely a visual assessment he had done. In addition, the screws on the jockey clamps had not been torqued, as required by the manufacturers. He accepted that a contractor without a torque wrench could get the same effect by finger tightening the screw and then using a spanner to make a further one-quarter tightening turn.

[39] Mr Reabow was referred to the opinion of Dr Bemont who suggested that score marks on the underside of the roof trusses were suggestive of the fact that a forklift, or a paper reel on a forklift had struck the pipe causing it to ride up against the underside of the truss and score the truss, leaving the marks shown on the photographs. Mr Reabow was unable to replicate the movement of the pipe against the truss but was of the view that because of the deformation of the threaded rods and set screws, it was not consistent with the pipe being hit from the side as contended for by the defendant.

[40] In cross-examination Mr Reabow conceded that the bent lug on the Klambon clamp may have been bent in any of a number of ways. Mr Reabow stated that he remained convinced that he could not find any damage on the jockey clamps consistent with the pipe having been struck by a forklift, or a paper load. He conceded that there was a possibility that the pipe had been struck from the side, but he regarded that as improbable. It was put to Mr Reabow that Mr Hlongwane would testify that when he had replaced the pipe, he had seen a 200mm score mark (made by the screw of a jockey clamp) on the top of a roof truss. The suggestion made to Mr Reabow was that such a mark would be consistent with the pipe moving towards

the door of the warehouse after being struck by something. Mr Reabow again said that it was possible, but he thought it was improbable. He stated that he would have expected there to have been a mark both on the top of the roof truss and on the surface of the underside of the top of the roof truss.

[41] Mr Reabow confirmed that he had discounted the fact that the pipe had been hit from the end of it with longitudinal forces along the length of the pipe causing the failure, because there was insufficient room for that to have occurred. Mr Reabow conceded that the pipe could have failed because of the Klambon coupling failing. Mr Reabow also appeared to agree with the suggestion of Mr Bemont in his expert summary that the pipe would have needed more than two hanger systems to fail to cause it to collapse, because of the strength of the Klambon fittings.

[42] Mr Reabow was cross-examined on what he would have considered the contribution of vibration to have been in the overall collapse of the pipe. In his view vibration was unlikely to have been the factor causing the pipe to collapse. Mr Reabow stated that there would be no additional force acting on the pipe at the point at which it failed, which came from the water itself contained in the pipe. His view was that if the pipe was intact there would have been no force on the pipe at the point of failure.

[43] Mr Reabow was asked about the possibility of a failure in stages i.e. if the forklift or its load had struck the pipe sometime before, and a reaction took place

very slowly which eventually ended in the failure of the pipe. Mr Reabow thought it was improbable that that could happen because of the type of clamps used to join the pipes and the rigidity of the joints. Once the couplings are tightened down on the joints, they are rigidly fixed in the grooves at the end of the pipes. It would have taken a significant blow to cause the pipe to part. Mr Reabow did not think it was possible to have an impact that did not fracture the pipe immediately but caused a change in the integrity of the pipe so that the pressure inside it became different and it caused the pipe to fracture at a later stage.

[44] By agreement between the parties, the evidence of Mr Hlongwane was interposed by the defendant. Mr Hlongwane worked for the defendant during 2006 and was a fitter and supervisor of the crew that installed the pipe. Eight workers in total were involved in installing the pipe. Mr Hlongwane had twenty-five years' experience in installing pipes and had attended training during 1996 in installing Klambon fittings. He stated that when fitting a Klambon fitting, they would firstly smear grease on the rubber ring on the end of the pipe as well as on the Klambon fitting. The nut would then be finger-tightened together with a spanner tightening thereafter.

[45] Mr Hlongwane then testified that when fastening the jockey clamps to the top flange of the roof trusses, the bolts would be finger-tightened and then tightened with a one-quarter spanner tightening, made in three short movements.

[46] Mr Hlongwane also stated that he had attended the site on the Monday after the collapse of the pipe. He had been instructed to take the parts of the pipe that had fallen to the ground outside, and thereafter to strip the remaining pipe from the roof trusses and re-install them in a different position. He stated that in removing the jockey clamps from the roof trusses he had found one where the bolt of a jockey clamp caused a scratch of about 200 millimetres following the line as the jockey clamp was forced out of its position. The scratch was on both sides of the top flange of the I-beam. The scratch on the top of the roof truss was deeper than the one on the underside of the roof truss which had only removed paintwork. After the installation of the pipe and until the time it failed, there had not been any leaks in the pipeline. Mr Hlongwane said he knew this because he had worked on the site for the five days after the pipe had been installed.

[47] In cross-examination Mr Hlongwane conceded that there had been another supervisor on the site, by the name of Terry. He also checked on the work and supervised to see that everything was properly done. Mr Hlongwane testified that each section of pipe was pulled up to the trusses independently and then secured by two jockey clamps. The next section of pipe would then be pulled up and joined to the secured pipe. He and one Eric Buthelezi had been responsible for fitting the Klambon joints. He also said that he checked that all the lock nuts were 'well tight' so that there would be no danger when he filled the pipe with water. He confirmed that he did not install the jockey clamp safety strap to ensure that the jockey clamps were secured to the roof trusses.

[48] Mr Hlongwane stated that he had been responsible for pressurising the pipe. It appeared that this had been done to 100 kPa pressure. When he had attended the site on the Monday he had, in addition to seeing the score mark on the roof truss, seen that one of the hanging rods from a jockey clamp was bent. He had found this lying on the floor of the warehouse. The pipes were hung so that the distance between the underneath of the roof truss and the centre of the pipe was 150 millimetres. He also told the court that when the pipe was erected in place, it hung at a level which was higher than the top of the doorway into the warehouse. When the hangers had been put into place, that was done in accordance with the diagrams which the construction crew had been given. Mr Hlongwane stated that although a pipe of two metres may have two hangers, depending on the position of the roof truss, the second pipe might not have two hangers – this depended entirely how far along the I-beam the pipe was hanging.

[49] The matter was then adjourned on the 13th March 2014 to enable the plaintiff to deliver an expert notice in respect of Professor Smith, and was only set down for the continuation of the hearing from the 6th June 2016. Professor Graham Douglas James Smith then testified for the plaintiff. He told the court that he was both a mechanical and civil engineer employed by the University of Kwa-Zulu Natal. He was present when Mr Reabow testified, and he recorded that he had not agreed with what Mr Reabow had said about the forces exerted on the pipe by the water inside it. He told the court that the pipe was pressurised by the mains pressure of the Municipal water mains and that would ensure an even pressure in the pipe, placing it under tension and that all components in the pipe – the flanges and bolts, etc would receive the same pressure. This would result in a stretching force on the entire

pipeline along its length. Because the pipe had a flat plate closure at the end of it, the force generated by the pressure within the pipe would lead to an axial stretching force in the vicinity of fifteen k/Newtons. The axial stretching force is the force parallel to the length of the pipe which would, if cut at any part along its length, be parted by that exact force. The pressure from the water mains would be approximately 4.9 bars.

[50] Professor Smith regarded it as improbable that a bump against the pipe could take time to cause the pipe to fail. Professor Smith stated that if the pipe was 100 per cent full of water any breach in the pipe would see it move apart for a small distance. If, however, air was in the system, the air would act like a spring because it would be compressed and would expand when it was released. It was the expansion of the air that would cause a greater reaction than if there was only water in the pipe.

[51] Professor Smith said that he believed that the failure of a jockey clamp occurred, which contributed to the failure of the pipe. He said that if a locknut was loose, and the screw attaching the jockey clamp to the roof truss was tightened, two things could happen:

- (a) the thread of the jockey clamp screw could strip, but there had been no evidence of that in this case;
- (b) the tightening of the clamping screw would open the mouth of the clamp which would cause an additive load – i.e. the load of the pipe together with the

water of approximately 305 kilograms and the tightening load. The jockey clamp would now be stressed above 355 kilograms.

[52] Professor Smith regarded a forklift strike as possible, but unlikely. He regarded the probable cause of the distortion to the Klambon clamp lug testified to by Mr Reabow as being the result of it falling onto the floor.

[53] Professor Smith then referred to the two white marks and the red smudge on the edge of the roof truss which was depicted in figure 28 of Dr Bemont's report. In his view these marks were consistent with a movement of the pipe in contact with the roof truss in a direction which was parallel to the length of the pipe and not at right angles to it, as it would be if the pipe had been struck by a forklift or a paper reel carried on a forklift. His view was that under the violent fifteen k/Newton force the pipe would have slid under the roof truss in contact with it, and then fallen to the ground. He was unable to comment with any certainty about the two dark railway track lines to the right of the parallel white lines and red mark on the roof truss. In cross-examination Professor Smith agreed that he and Dr Bemont were largely in agreement, save for the trigger event which caused the failure of the pipe. He agreed that it was necessary to draw a distinction between the way in which the pipeline would be expected to move when a force was exerted upon it, and what had caused it to move in the first place. He conceded that there must have been an 'event' which caused the pipe to move.

[54] Professor Smith conceded that if the Klambon fittings had been correctly installed, the pipe would adequately have contained the five bar pressure exerted by the municipal water system. Professor Smith opined that each pipe was secured by one hanger with the other side relying upon the Klambon fitting. If there was a dislocation, then the pipe would seesaw in its metal strap and the violence with which they parted was dependant on the air in the system. If there was any air in the system it could have lifted up the pipe. He conceded however that there had to be a trigger event, which could have been a failed clamp. In response to the suggestion that Dr Bemont's report showed no evidence of the failure of a Lindapter jockey clamp, Professor Smith suggested that the data used was insufficient because there was only one example of extreme over-tightening.

[55] It was put to Professor Smith that Dr Bemont would say that the air pressure would not cause the pipe to have moved as he had suggested, because it could not be greater than that of the water, which was five bars. Professor Smith repeated his statement that if there was water only in the pipe, the two parts would have moved gently apart as the pipe failed. If there was air in the system the result could have been vastly different and the air would act as a coiled spring in expanding, which the water would not do.

[56] Mr *King* for the defendant put it to Professor Smith that if a reel of paper on a forklift had struck the pipe, that load would have been on the way out of the warehouse – i.e. in the direction of the door. Professor Smith stated that if that were so then Mr Hlongwane's evidence must be wrong because the scratch could not

have proceeded in an uphill direction along the roof truss as contended by Mr Hlongwane. If however a contact had occurred in the other direction and a jockey clamp was loosely tightened, the mark could be explained. However he conceded that the mark was not part of the trigger event. He did not accept that Dr Bemont's view of the failure was more probable than his own. Professor Smith stated that although it was very difficult to be certain how things had dislocated, the load would still have been redistributed to the remaining clamps once a failure occurred.

[57] The plaintiff then closed its case. In addition to the evidence of Mr Hlongwane, the defendant called the following witnesses:

- (a) Mr John Werner Renhardt Goring, the managing director of ASIB;
- (b) Paul Stephen Hess, a branch manager of the defendant;
- (c) Dr Clinton Pierre Bemont a registered mechanical engineer and former full-time lecturer in the school of mechanical engineering at the University of KwaZulu-Natal.

[58] Mr Goring testified that prior to 1970 there were no standards for fixed fire protection sprinkler systems. To comply with international norms, ASIB was created to establish standards and the policing of the sprinkler industry. Mr Goring has been employed by ASIB for over 37 years and has extensive experience in the installation and maintenance of sprinkler systems. Since 1982 he has been the sole author of the sprinkler rules used in South Africa, which are recognised both nationally and internationally. He was instrumental in the formation of SABS standards and is

currently the author of the South African National Standard which has been accepted and prepared for final approval by the South African Bureau of Standards. He lectures in sprinkler hydraulics and hydro-statics, inter alia, at the College of the Fire Protection Association of South Africa. Approximately 7 500 inspections per year are carried out by ASIB, including in other areas in Southern Africa.

[59] Mr Goring stated that the load on each jockey clamp was approximately 301 kilograms. There are two kinds of clamps, one made of cast iron and the other made by Electromould which was a fabricated mild steel clamp. He confirmed that pipe hangers should not be in the middle of a pipe, but within the first two metres of the end of a pipe. He said that as a pipeline progressed 'creep' would be introduced whereby the hanging supports would move into the second third of a subsequent pipe. He conceded that he had not seen the physical installation of the pipe at the warehouse, and had relied on measurements which he had taken from the drawing. He stated that because the jockey clamps could only be mounted to the roof trusses, installers would attempt to get them as near as they could to the correct position. If a problem arose in that regard, the inspector would take note of it, and request remedial action where pipes were not properly supported. In his view the installation in this case was acceptable and standard equipment had been used. He had never come across a failure of a pipe because of an over-tightening of the set screw on a jockey clamp. He said the use of jockey clamps on inclined roof trusses was commonplace. Roof structures are almost never flat and there were virtually no installations where the jockey clamps would have been installed on horizontal roof trusses.

[60] With regard to the safety strap recommended to be used on the jockey clamps, he maintained that they were not available and had never been used in South Africa. He said that he did not think he had ever seen a clamp failure without some external force being exerted upon it. He conceded that hangers do come adrift but usually as a result of movement in the building or the structure. He thought it unlikely that there could have been extensive movement at the warehouse in the five day period from when the pipe was installed. Once the pipe had been pressurised and supported, a fault would have shown up at that stage. He would expect leaks and other faults with the system to occur after the pipe had been up for approximately 18 months. It was for this reason that inspections were conducted every six months on pipe installations.

[61] He stated that the Klambon system was extremely strong, robust and flexible even where a support moves. He said that although hangers may become dislodged in time, that would not result in a breach of the pipe. He knew of only one instance where the collapse of a pipeline was attributed to a lack of support. Clamps had become loose and failed to provide their intended support. This was monitored and corrected in the normal course of events.

[62] Mr Goring was of the view that in 95 to 99 per cent of cases where a pipe had failed, it was due to an external force exerted upon the pipe. He said in warehouse situations most of the pipe failures are caused by forklift strikes. He was also of the

view that a forklift strike would not necessarily result in the instant collapse of the pipe work. He said that a failure could occur several hours or days or weeks later. In his view a forklift strike could cause the supports on a pipe to move and when something else happened, for example a surge in pressure, a failure could result.

[63] In cross-examination Mr Goring maintained that only where the majority of hangers encroached into the central portion of the pipes would remedial action be required. He was unable to comment on the statement made by Mr Osborn that he had been concerned when he saw one hanger per pipe, approximately in the middle of each one. Mr Goring said that according to the measurements on the plan that could not have been so. He conceded that he made this statement on the basis of his assumption that the drawing was an accurate representation of the installation itself.

[64] Mr Goring conceded that the certification of products forming part of the hangers would only occur when a product was brought into the market, and he would not be aware if manufacturers had cut corners with regard to quality. He confirmed that there had been no certification of the Electromould product. He was unable to comment on whether the Electromould jockey clamps had been tested for failure, or the level at which they would fail.

[65] Mr Goring also testified as to the physical inspection carried out by ASIB on each site. It was common cause that no inspection had been done prior to the

failure of the pipe in this matter. Mr Goring conceded that it was one of the ASIB rules that pipe hangers should not be mounted in the middle two metres of a six metre pipe. Mr Goring also testified to the listing of approved products by ASIB, which was done on a voluntary basis. His evidence was that the rules of ASIB were required to be complied with, but not always exactly, and that allowances were granted. They were not intended to be applied exactly and in every case, but were instead a guide to proper installation and maintenance. He conceded that during inspections, ASIB inspectors found many unacceptable installations and examples of shoddy workmanship. He conceded that it would have been better to have had two jockey clamps per length of six metre pipe because that would be strictly in accordance with the support criteria. He said that installers operated on very small margins and were extremely competitive. They had a tendency to use minimum standards where possible. He also said that if there was too large a distance between roof trusses, a trapeze bar could be installed, but this was a very costly process. It would enable more hangers to be put into place which could not otherwise be done. An installer would not include costly items in a tender document when those items were not called for by the design.

[66] Mr Goring confirmed that the jockey clamp safety straps were not available in South Africa. It was his view that the safety strap was apparently not used in the United Kingdom. He knew about the recommendation for the safety strap to be used on the jockey clamps, but the present system had been used in an untold number of installations with no failure. The method of installation was then accepted and that may have been the reason why the safety strap had not been used in South Africa.

[67] Mr Goring considered that it was possible that a forklift had struck the pipe in this matter but conceded that it was also possible that a clamp or threaded bar had failed. He regarded it as unlikely that a Klambon fitting had been incorrectly installed because the gasket would not seal and it was likely to have leaked. Mr Goring was of the view that the pipe may well have been struck by a forklift or load at a prior time, and a surge of pressure then caused the Klambon fitting to fail.

[68] Mr Goring confirmed that the way a pipe is pressured is by connecting it to the municipal water system and feeding in water from an existing supplier. If there was a bleed valve it would be open to purge any air in the system. A standing pressure of approximately five bars would be reached which could be boosted if necessary by a small jockey pump or manual pump and could be increased up to ten bars. That pressure would be maintained for a stipulated time in order to test the system.

[69] Mr Goring also maintained that the advantage of the Klambon fitting is that it is able to endure a large deflection before a leak becomes apparent. He opined that a seven to eight degree deflection of the two pipes held by the Klambon fitting would not result in a leak. Generally more than that would result in a drip or stream of water emerging from the joint. He said that because the Klambon straightened under pressure it was more durable and less likely to leak. It was this flexibility of the fitting which allowed connected pipes to go over hills.

[70] Paul Stephen Hesse then testified that he was a branch manager of the defendant and had been called to the site on the Saturday morning after the failure. He had arrived at approximately 8.30 to 8.45 am and found the warehouse floor largely cleaned up. The new pipe was not intact and there were two six metre lengths of pipe on the floor which had been moved over to one side. He had met Terry O'Brien on site. Mr O'Brien had been the site supervisor of the installation. He said that they had used jockey clamps made by various manufacturers, because Lindapter clamps had become difficult to obtain. He said that whilst ASIB supplied the tolerances within which they worked, the companies supplying the jockey clamps had to supply certificates showing that the loads which could be supported by the jockey clamps conformed to ASIB standards. His view was that the system had been up for a week, and that pipes did not just fall down. They are rigid but do flex a bit and a force had to act upon them to cause them to fail. He testified to the normal practice used by the defendant in pressuring a new pipe, but he had not been present when it was done in this case. The system had not been inspected by ASIB because it was not yet complete. His view was that a Klambon fitting in the centre of the pathway leading to the door had been struck by some external force, causing it to fail. He conceded however, that he did not know where the pipe first failed.

[71] Dr Clinton Pierre Bemont testified that he was a registered mechanical engineer. He had been a full-time permanent lecturer in the School of Mechanical Engineering at the University of KwaZulu-Natal between 2008 and 2013, whereafter he had started his own company, BB Metspect which specialised in investigating and analysing mechanical failures. His view was that it was unlikely that the system had failed without evidence of some external mechanism impacting on the pipe such as a

forklift impact. Such an impact could have caused many different things to occur from that point onwards. Dr Bemont testified that he had conducted a series of tests in order to determine the failure point of various jockey clamps. To the extent that lock nuts may have been over or under tightened, that was not a likely cause of failure of the jockey clamps. The scratch mark testified to by Mr Hlongwane made sense because it could have been in any direction of a strike which had actually occurred on the pipe, which was an unknown factor. In addition the indentation would be greater at the end of the scratch and not at the beginning as Hlongwane believed it was. With regard to the evidence of Professor Smith that the pipe would have undergone a snaking motion when the pressure was released, that was not impossible, but he considered it highly unlikely. It was also possible that because the pipe was not held securely in each band at the bottom of the hanger, that it could move through the hoop in a backwards and forwards direction.

[72] Dr Bemont stated that the five bars of air pressure for any air contained in the pipe was not a lot of pressure in engineering terms. It was a store of energy which could be compressed and stored, and only when the pipe ruptured would the air play a role. With no air there would have been no snaking or rocking of any significance. Dr Bemont was also of the view that the inclination of the trusses played no role in any failure. They had tested both inclined and horizontal truss fixtures and there had been no difference. He was also of the view that using a twelve millimetre rod (as opposed to a sixteen millimetre one) as part of the hanger system was not a likely cause for any failure. In his view thermal expansion could almost entirely be discounted because all the elements of the building and the pipe construction were

made of steel and would expand and contract at approximately the same rate. In addition, vibration would be low.

[73] Dr Bemont was also of the view that it would have been best to have used only Lindapter clamps, but his view was that the use of other clamps had not been a cause of the failure. Although the schedule showed that Electromould adaptors failed at a lower level than the others, they failed at measures of double the load required to support the pipe. His evidence was that there is little disturbance on a pipe as it hangs. It is a simple engineering structure, but once it fails the loadings then become complicated. He confirmed that the safety strap which could have been used on the jockey clamps was not available in South Africa. He was of the view that none of the aspects referred to by Mr Reabow was the probable cause of the failure. His view remained that the most likely cause was the pipe being struck by a forklift, or a load carried by a forklift.

[74] Dr Bemont conceded that it was possible to install systems to reduce the likelihood of a forklift strike, but this could have increased costs or been difficult to implement. He maintained his view that it was unlikely that poor installation would have caused the failure which occurred. Once something exerted pressure on the pipeline which caused the failure, the breakage would have occurred at one of the Klambon fittings. His view was that although air trapped in the pipe may have contributed to the failure, it could not have constituted the trigger force which initiated the failure. Even if two jockey clamps had failed he would not have expected that

the system would fail. He conceded that the damage seen on the Klambon fitting lug could have been caused from striking the ground.

[75] Dr Bemont was of the view that once a force was exerted upon the pipeline, it would have moved upwards and struck the underside of the truss leaving the marks which were seen on the truss afterwards. Whatever horizontal force had struck the pipe, it would have been amplified at the jockey clamp end and threaded bar, by a factor of approximately four. It was the pipe coming into contact with the truss which had left the paint mark on the truss. He referred to a photograph which showed that a strap which had held the pipe was distorted, and in his view that was consistent with the pipe having come into contact with the roof truss, which distorted the shape of the strap. He regarded it as likely that there had been a significant impact between the pipe and the roof truss. He found it difficult to imagine any other cause other than a forklift strike causing this force on the pipe.

[76] Dr Bemont conceded that the Electromould jockey clamps were thinner, and therefore weaker than the other types of jockey clamps which were used in the installation of the pipe. He conceded that it was a difficulty that nobody knew which jockey clamps were in place where the break occurred. He conceded that each section of pipe appeared to have been secured by one hanger from a roof truss.

[77] Dr Bemont considered that a forklift strike would have contained a lot of energy and probably caused the failure. It was as a consequence of this that two

pipes fell down and two more became loose. He conceded that once the pipes came apart any air pressure which existed in the pipe would come into play. Dr Bemont was extensively cross-examined on the tests which he had conducted on the Lindapter and other jockey clamps. His view was that the different type of clamps would ultimately have made no difference. He recorded that his function was to understand what had caused the failure of the pipe. He saw no relevance in testing longitudinal loads when there was no suggestion that the pipe had moved sideways and then just come apart. He also said that it had never been suggested that by losing one jockey clamp, the Klambon fitting would part, but he conceded that once a Klambon fitting failed, the system was doomed.

[78] Dr Bemont stated that, had he designed the pipe system, he would have put in two hanging supports per pipe. He conceded that if the hangers were not spaced equally, there would have been a resultant loading on the pipes. His view was that because the trusses were six metres apart, and the pipes 6.1 metres in length, the load on each hanger would have been the same. He did not agree with the ASIB rules that the hangers should not go outside of the first third of a length of pipe, and was of the view that a hanger in the middle of the pipe would be adequate. Dr Bemont agreed with Professor Smith's statement that the pressure in the pipe would be uniform along its length. He conceded that there would be small increases of pressure in the pipe during the day because the water came from the municipal water supply, but he maintained that the pressure would largely remain static. In reply to the suggestion that the pipe may have slipped in the straps holding it, his view was that that would not have occurred without a cause.

[79] In dealing with the difficulties which would have been caused by a forklift driving into the warehouse and then having to raise its load or mast in order to come in contact with the pipe, Dr Bemont expressed the view that drivers move their loads up and down as they travel and that they could have been swinging around after having lifted a roll of paper when the impact occurred.

[80] Under cross-examination Dr Bemont maintained that it was almost certainly a reel of paper carried by a forklift which had struck the pipe. The force would have caused deflection of the pipe and the subsequent bending of the lug referred to by Mr Reabow. This was because the Klambon tightening bolts would all have been positioned horizontally in the pipe according to the evidence of Mr Hlongwane.

[81] With regard to the use of the safety strap on the jockey clamps, Dr Bemont agreed with Mr Reabow that it would have been a good thing to use it, but he was not sure how practical that was. He opined that it would increase the load capacity of the clamp. Dr Bemont conceded that if there was a massive release of compressed air, it was unlikely that pipes would be left on top of the paper roll in a straight line. Snaking and rocking of the pipeline would have been significant in that event.

[82] In response to questions by the court Dr Bemont stated that in the case of a forklift strike there would usually be an instantaneous failure of the pipe, but there

was a possibility that a previous impact could have caused the failure. He said that in such a case:

- (a) the intensity of the strike need not be that great because of the lever arm movement of the pipe;
- (b) a failure required a trigger mechanism;
- (c) the water was already present in the pipe;
- (d) for a reel carried by the forklift to strike the pipe, the driver would have had to have lowered the mast in order to get under the door. It was also possible that such a strike would have caused a crack in a clamp which could have slowly propagated until it failed. This was more particularly so in a case where there is corrosion of a clamp after it had cracked.

[82] That was the case for the defendant.

[83] Mr *Kissoon Singh* submitted that the possible corrosion of a clamp was not the case which the plaintiff was required to meet. There had been no expert notice of this in the expert summaries. The plaintiff had to meet the case of the defendant in order to demonstrate that the forklift driver was not at fault. This had been a positive averment made by the defendant as to the cause of the failure of the pipe. Whilst the plaintiff bore the onus of establishing negligence, it was also required to disprove the defendant's version and establish that the allegations set out in its particulars of claim were connected to the cause of the failure of the pipe.

[84] Mr *Kissoon Singh* submitted that the principle of *res ipsa loquitur* was applicable. This was because :

- (a) the pipe was *in situ*;
- (b) nothing interfered with it; and
- (c) it broke apart.

[85] Common sense would dictate that something caused the break, and that is why the defendant, in looking for a cause of the failure, alleges that it was a forklift strike which caused the failure.

[86] Mr *Kissoon Singh* submitted that the witnesses for the plaintiff, Mr Reabow and Mr Osborn, were in a better position to opine on this aspect because the defendant's witnesses did not attend at the site. Mr Osborn was a loss adjustor and his principals would have to pay for the consequences of the failure. Mr Osborn saw how the pipe was hanging and he thought that it was incorrectly suspended. In addition he looked at the forklift, spoke to its driver, focussed on the pipes and called in Mr Reabow. The theory of an inadequate installation was confirmed by the defendant's witnesses, Mr Goring and Mr Hesse, who confirmed that in the installation industry costs are of paramount importance and that there is intense competition amongst installers. An installer would not lightly quote for extras such as

cross members and trapeze bars not reflected on the drawings because they are additional expenses.

[87] Mr *Kissoon Singh* submitted that one cannot adopt the attitude that costs are paramount. There is a duty to ensure that pipes are properly installed and safe for the purpose for which they were intended. He submitted that the use of Electromould jockey clamps, as opposed to the more acceptable stronger Lindapter jockey clamps, was negligent because it was a jockey clamp of unknown strength. No-one was called by the defendant to show why those jockey clamps had been used and this was something within the knowledge and control of the defendant.

[88] Mr *Kissoon Singh* submitted that it was also negligent to surpass the working load of the jockey clamps. He pointed out that 14 of the 22 Lindapter jockey clamps tested by Dr Bemont failed below the safety factor level of 1 264 kilograms. The reason why such a safety factor was referred to by manufacturers was because it could not be held liable for the consequences of exceeding the safe working load. He queried why the defendant as the installer did not know that the load was greater than the manufacturer's specifications. Mr *Kissoon Singh* also pointed to the fact that one jockey clamp for each pipe was used all along the pipeline in contradiction to the requirements of ASIB.

[89] Mr *Kissoon Singh* emphasised that the ASIB regulations stated that the hangers should not be in the middle one-third of the pipes. Because of the 'creep'

testified to by the witnesses, two of the hangers had exceeded that requirement by half a metre. He also criticised the fact that a sixteen millimetre threadbar was required by the regulations, whereas a threadbar with a core diameter of twelve millimetres had been used. Although Mr Goring had said that this made no difference, Dr Bemont had conceded that the strength of each rod was more if a sixteen millimetre threadbar was used than if a twelve millimetre threadbar was used. Mr *Kissoon Singh* also referred to the fact that Dr Bemont had conceded that it was better that each pipe should have had two hangers per pipe as had been done when the pipe was re-hung after the incident.

[90] Mr *Kissoon Singh* submitted that where the plaintiff had alleged bad workmanship and components, one would have expected the defendant to show the contrary. This was never done. The evidence of how Mr Hlongwane and Mr Buthelezi had placed the hangers was not led, and there had been no information provided regarding the tightening of bolts, etc.

[91] Mr *Kissoon Singh* pointed to the fact that Mr Reabow and Mr Osborn had initially both suspected that the failure of the pipe was due to a forklift strike. They had both ruled this out after speaking to the forklift operator. He submitted that the plaintiff had demonstrated that it was probable that the installation was improperly done and the most likely cause of the failure of the pipe. The explanation of Mr Reabow and Professor Smith for the marks on the underside of the truss had not been discounted by Dr Bemont, who regarded the possibility of the marks having

occurred in the way described by them as unlikely. However, Mr Reabow and Professor Smith had regarded the explanation as a probable one.

[92] With regard to the damage to the Klambon coupling, Dr Bemont conceded that it was possible that the lug had been damaged when the pipe fell to the floor. In addition, Klambon recommended that pipe bends should be supported, which was not done properly in this case. Mr Reabow was of the view that the over-tightening or the under-tightening of any of the lock nuts on the jockey clamps would have made a difference. However, Dr Bemont only tested one of each of them. This was inadequate.

[93] Mr Kissoon Singh submitted that Dr Bemont said that although the safety straps for the jockey clamps were not freely available in South Africa, they could have been easily manufactured. The defendant should have followed the manufacturer's recommendation in this regard. Both Mr Reabow and Professor Smith were of the view that the safety straps should have been used, and Dr Bemont conceded that it would have been of assistance. The jockey clamps were overloaded to a greater extent than was recommended by Lindapter in circumstances where every pipe was fully loaded. The installer should have realised that the pipes were overloaded. There was no evidence led by the defendant as to why it disregarded the recommendation to use the safety strap.

[94] In addition, the recommendations regarding the Klambon fittings and the anchoring of the pipeline on the bends was not followed. The cumulative effect of one or more of these factors probably caused the failure. Dr Bemont did not conduct tests to show the failure load at which the clamps would fail as contended for in the plaintiff's suggestion of a longitudinal failure. Mr *Kissoon Singh* submitted that it had not been established how the jockey clamps had slipped off the I-beam. Once one slipped off, it was common cause that it would load the others. The tests done by Dr Bemont were on a vertical pulling force, and he had not seen the need to do other tests. In addition no-one actually knew how many of the jockey clamps had failed, and how many of them had been the inferior Electromould clamps. These should not have been used.

[95] Mr *Kissoon Singh* submitted that with regard to a forklift impact there were three possibilities:

- (a) that the evidence of the witnesses at the site was the truth;
- (b) the theory of Dr Bemont was probable; or
- (c) the observations of Mr Osborn and Mr Reabow, who had concluded that there had been no forklift strike was the most probable explanation.

[96] With regard to the opinions of Dr Bemont, his evidence was speculative and based on photographs. On the other hand, Mr Padayachee of Springbok Trucking whose whereabouts had been established very shortly before the trial, testified that he was now self-employed. In those circumstances he had no reason to fabricate

any evidence in favour of the plaintiff. He told the court that he was standing about twelve metres from the pipe when it burst. At that stage the roll-clamp forklift was nowhere near the scene and not in his vision. He said if it had been, he would have noticed it. Mr Padayachee also testified that the reels which were to be transported on the truck had come from a stock on the other side of the warehouse and that Sagren had been removing the reels one at a time. At the time of the incident Sagren was outside the warehouse.

[97] Mr Moodley, another independent witness, testified that when he arrived Sagren was under the canopy and neither he nor his machine were wet. This is an important observation because Mr Moodley was looking for an explanation for what had happened. He confirmed that the reels which were removed from the warehouse by Sagren were far away from the place where the pipe failed. In addition Sagren and his machine were not wet and he had observed this because he felt it was his duty to investigate the matter and establish what had happened. On the scene he spoke to Sagren who told him that he was outside at the time that the pipe had failed.

[98] Sagren had been working at the warehouse for three years and testified that the roller shutter door had never worked during this period. He was the only person working on the night and he was loading from the pre-marshalling area outside the warehouse when the incident happened. The paper which he had been collecting to place into the pre-marshalling area and onto the truck had been taken from the other side of the warehouse some 100 metres away from where the pipe collapsed. He

testified that when he carried a reel of paper, he would ensure that it was no more than 30 to 40 centimetres above the ground, and that he only carried one reel at a time. He said that he had travelled at approximately five kilometres an hour and would be aware had his hystor bumped into anything.

[99] Mr *Kissoon Singh* submitted that the plaintiff's witnesses were cross-examined and no inroads were made into their evidence. They were not educated people, and had not been working for the plaintiff at the time of the trial. No evidence had been adduced by the defendant to establish that they were being untruthful. On the probabilities a forklift strike of the pipe was unlikely. This is so because, on the evidence, it could only have occurred as a forklift was approaching the warehouse door. As the pipe was a level higher than the top of the door, the forklift driver would have had a very short period within which to lower his load prior to passing through the doorway and after striking the pipe. In addition there was the inherent improbability that if a forklift struck the pipe and caused it to collapse, then both the driver and the forklift itself would have got wet. As none of the above had been established or was probable in the circumstances, it had been overwhelmingly established that a forklift strike had not been the cause of the collapse of the pipe.

[100] Mr *Kissoon Singh* also pointed to the fact that Mr Reabow who was an experienced engineer had gone to look for evidence of a forklift strike because that is what he had been told had occurred. He was not convinced that that was in fact what had happened, and accordingly looks for another explanation, and come to the conclusion that the failure of the pipe had been because of poor installation. In

attempting to disprove the theory of Mr Reabow, Dr Bemont's evidence was all based upon an assumption of a forklift strike causing an instant failure. In cross-examination he had said that the incident would have taken place within a few seconds of the pipe being struck by a forklift. Mr *Kissoon Singh* submitted that Dr Bemont had been somewhat defensive of the position he had adopted when assessing the evidence. The evidence of Mr Reabow was that a forklift strike with a delayed reaction was highly improbable, and Professor Smith agreed with this view. Those views were not challenged in cross-examination. No expert evidence had been provided by the defendant dealing with this aspect.

[101] Mr *Kissoon Singh* submitted that in the circumstances:

- a) the likelihood of a forklift strike was improbable; and
- b) the plaintiff had no case to meet on the suggestion of a forklift strike resulting in a delayed failure of the pipe.

No incident reports had been produced covering the five days after which the pipeline was installed. No witnesses were called in this regard and in the circumstances the inference of negligence in the installation of the pipeline was inescapable.

[102] Mr *King* drew attention to two aspects of the plaintiff's case :

- (a) that the plaintiff had led no evidence of what the actual trigger mechanism was, which caused the collapse of the pipe; and

(b) the time spent attempting to dispel the theory of a paper strike.

Mr *King* submitted that the defendant does not have to prove how the incident occurred. It is for the plaintiff to establish on the probabilities the cause of the incident, the act of negligence on the part of the defendant, and the causation between those two. In this regard he referred to *Buthelezi v Ndaba* 2013 (5) SA 437 (SCA) at paras 14 to 16. In this matter a surgeon had testified that something had gone wrong during a surgical operation although he had done everything correctly in carrying out the medical procedure. In those circumstances the court had held that the surgeon had not been negligent.

[103] In this case the plaintiff's witnesses spoke about incorrect installation but when cross-examined on this issue, Mr Reabow had referred to what could have contributed to the failure. Mr *King* submitted that this was an incorrect approach. What one had to do was start with the cause of the failure and then link it to negligence. It was incorrect to approach the matter the other way around.

[104] Mr *King* submitted that although much depended upon what the existing hangers were doing at the time of the failure, the conclusion was something of a guess by the experts. Nowhere does the plaintiff pin down the 'trigger event' responsible for the cause of the failure. On the other hand, Dr Bemont's evidence dealt with the likelihood of failure. Although Professor Smith had a theory of the longitudinal movement of the pipeline causing a brush with the truss and leaving paint marks, he was unable to say why this would have occurred. It was the view of

Mr Reabow that the most likely cause of failure was a Klambon fitting, but that would have leaked had one of them been faulty. This would have been detected by the staff on site.

[105] Mr *King* submitted that if the actual cause of the failure of the pipeline was not established, then there was nothing to which negligence could be linked. The experts had discounted a longitudinal force as probable and the lateral blow had been described as possible, but not probable. There was no evidence that vibration would have played the key role in causing the failure.

[106] With regard to a delayed reaction Mr *King* submitted that whilst it was possible, the experts regarded it as not being probable. It was necessary before any conclusion was made that negligence was involved, that a probability was established as to the immediate cause of the failure. With regard to the criticism of the defendant for not calling further witnesses and testing more equipment, Mr *King* pointed out that the plaintiff bore the onus and Mr Reabow had made no experiments at all. The investigations conducted by Dr Bemont had specifically been directed as testing Mr Reabow's theories. In this regard the weakest jockey clamps and the worst moulded one was capable of bearing twice the weight it was expected to carry. But what caused the extra load leading to the failure. The experts agreed that the load was static when the pipe is up and under pressure, and the pressure of the water was an internal force distributed evenly through the pipe along its length.

[107] Mr *King* submitted that the observations of Mr Osborn were not those of an expert, because he was a loss adjustor and not an engineer. It was his suggestion that had pointed Mr Reabow in the direction of a faulty installation. If the cause of the failure was a failed jockey clamp, where was that clamp situated and what caused the failure? These questions have not been answered by the plaintiff. Mr Reabow relied on observations he made of Lindapter jockey clamps picked up at the scene. His observations did not establish a cause. In addition Mr Reabow had made no tests whatsoever in order to establish whether over- or under-tightening had been present. It is, however, clear from the expert evidence that the failure of one jockey clamp would not have caused the system to fail. Mr *King* stressed that allegations in a vacuum do not establish a probability. Those allegations must be connected to the negligence alleged. In this regard the allegations of a failure properly to support the bends in the pipe were not demonstrated to have caused a failure. It was unfair to accuse Dr Bemont of attempting to justify his theory. He had conducted tests based on what Mr Reabow maintained was wrong with the system.

[108] With regard to the absence of safety straps, Mr *King* submitted that thousands of installations had been carried out and none of them had fallen down in the manner the pipe in this matter had failed. Without establishing the cause of the failure it was impossible to know whether or not the safety straps would have assisted. With regard to the evidence of the plaintiff's witnesses on site, Sindulal had contradicted where Sagren said he was when the incident happened. In addition Sagren had avoided testifying about going in and out of the warehouse, when the evidence of the witnesses established that that had clearly taken place. It was also clear from the evidence that when Mr Padayachee drove the truck onto the premises Sagren still

had to fetch more reels from the warehouse itself. Mr *King* submitted that the contradictions between the plaintiff's witnesses were enough to establish that Sagren had not told the court everything that happened. The possibility cannot be dismissed that he was being untruthful about what had happened on the night in question.

[109] It is common cause in this matter that at about midnight on the 25th August 2006, a section of the main sprinkler feeder pipe installed by the defendant five days earlier came apart, and the area beneath it was flooded, resulting in water damage to the paper stored in the warehouse. Mr *Kissoon Singh* accepted that the onus was on the plaintiff to establish the defendant's negligence and that that negligence was a cause contributing to the failure of the pipe and the consequent damage. In the plaintiff's particulars of claim the following allegations of negligence were made:

- (a) that the pipes forming part of the sprinkler system were inadequately supported, in that the clamps and supervision rods used to support the pipes were insufficient in number, and/or unsuitable for the required purpose and/or improperly installed and/or the safe working load of the supports was exceeded;
- (b) the joints between each section of pipe were unsupported;
- (c) but for the improper and/or inadequate fitting and securing of the supports to the fire sprinkler pipes the collapse would not have occurred.

[110] The defendant alleges that the piping was installed in a proper and workmanlike manner and that the equipment used in the installation was adequate,

sufficient and fully in accordance with design parameters for such an installation. In addition the defendant alleged that Sagren Adikanny was operating a hyster forklift truck inside the warehouse to move reels of paper, and in doing so he bumped the pipe, causing it to dislodge the Klambon coupling, in consequence of which the joint separated.

[111] The *res ipsa loquitur* doctrine does not create a presumption of negligence, nor does it alter the incidence of the onus. It only arises in circumstances where the facts establish that an inference of negligence is appropriate. This prima facie inference must then be displaced by evidence adduced by the defendant. This does not mean that there is an onus on the defendant to establish the facts on which it relies on a balance of probabilities.

See: *Arthur v Bezuidenhout & Mieny* 1962 (2) SA 566 (A)

The doctrine is invoked where a plaintiff is not in a position to lead evidence because the evidence is peculiarly within the knowledge of the defendant. It is the occurrence itself which establishes the drawing of a conclusion of negligence. The incident which occurs is in those circumstances one which would not ordinarily occur unless the defendant had been negligent.

[112] The inference of negligence upon which Mr *Kissoon Singh* wishes to rely in this matter is the method of installation of the pipe by the defendant, and the materials which it used in doing so. In my view, it is improbable that the pipe would have failed without negligence. But what act of negligence, and by whom? As I

understand the application of the *res ipsa loquitur* doctrine, in the event that I am unable to determine the cause of the failure of the pipe because the probabilities are evenly balanced as to what precisely caused it, then the plaintiff cannot succeed.

[113] In this matter the plaintiff is not in a position where it is unable to adduce evidence of the actual installation because that was all within the knowledge of the defendant. Whilst the defendant was responsible for installing the pipe, the plaintiff caused investigations to be carried out immediately after the failure of the pipe. It was given access to the warehouse and was able to examine the pipe and the hanging system which supported it. It was in a position to examine and determine the nature of the materials which formed part of the structure and investigate whether or not they were sufficient. In addition the plaintiff had available to it, and led the evidence of, the persons working in the warehouse at the time the pipe failed. The first assumption which was made by the plaintiff's representatives was that a forklift truck or its load had indeed struck the pipe. But that theory was discounted, and the evidence of the only forklift driver working in the warehouse on the night in question was led. That evidence was backed up by the theoretical evidence of Mr Reabow and Professor Smith.

[114] Having heard the evidence of the plaintiff's witnesses who were present on the night in question, I do not believe that their evidence can be disbelieved. In this regard I have in mind particularly the evidence of Sagren Adikanny that in the execution of his duties on that night, the forklift which he was driving and the load contained thereon did not strike the pipe. He is an impartial witness in the sense that

he is no longer employed to carry out work for the plaintiff. His evidence was that it was not possible for him to have struck the pipe and been unaware of it. I find this evidence particularly compelling because the evidence of all the experts was that the pipe was very heavy, each six metre section of it weighing approximately 355 kilograms. It seems grossly improbable that a load carried on the forklift driven by Sagren could have struck the pipe and he did not become aware of it. In addition to any other evidence in this regard there is the probability that had he had the load so high that it could have struck the pipe, he would have had to have lowered the load in the five metre space between the pipe and the frame of the roller shutter doorway of the warehouse. Had he not lowered the load in that space he would have struck the top of the roller shutter doorway frame. Had he indeed struck the pipe and it had not immediately collapsed, there seems no reason for him to have been untruthful in that regard. It seems clear that if his forklift or the load on it had struck the pipe and had that strike caused an immediate breach, a deluge of water would have descended upon both him and his machine. The evidence of all the witnesses was that both he and his machine were bone dry after the incident.

[115] Having analysed the evidence in this way there is a temptation then to disregard the possibility of a forklift strike entirely. However, the evidence of Mr Goring was to the effect that it was possible that a forklift could strike the pipe and cause damage to it which could only cause the pipe to fail some hours, days or weeks later. This could occur where there was a forklift strike, and later a surge in water pressure actually triggers the failure.

[116] On the other hand Mr Reabow and Professor Smith thought it unlikely that that could happen. In their view once a Klambon joint had been compromised, it would leak and that evidence would demonstrate its pending failure. It seems to me that that concession in itself seems to indicate that although they both dismissed the notion, there remains the possibility that a forklift strike could have occurred, and the damage only occurred later when it collapsed. The initial strike could have been by another forklift driver in an entirely separate incident some time previously. The forklift driver could have realised that he had struck the pipe but thought nothing more of it because nothing happened at the time he struck it. He could well have assumed that he had 'got away with it' so to speak because no consequences had evidenced themselves.

[117] Against the scenario of a strike with a delayed result, must be weighed the plaintiff's suggestion that the installation of the pipe was negligently carried out. With regard to the installation of the hanger system, Mr *King* submitted that whilst criticisms may be levied against various aspects of the installation, there was no evidence whatsoever to demonstrate that any one or more of those criticisms could be held responsible for the failure of the pipe. Throughout the trial he looked for evidence of a 'trigger mechanism' which had caused the failure of the pipe. Other than a forklift strike, there was no other evidence of such a trigger mechanism. Mr Reabow was of the view that the cumulative effect of improper hanger positioning along the six metre lengths of pipe, the use of jockey clamps where the safe working load was exceeded, the use of a hanger thread of 12 millimetres instead of the recommended 16 millimetres and the failure to manufacture and install safety straps on the jockey clamps could, when all taken together, have caused the collapse of the

pipe. This evidence was in large part contradicted by the evidence of Mr Goring who was able to claim vast experience in examining installations. Indeed, Mr Goring referred to his forty years of experience in comparison with the lack of experience of Mr Reabow and Professor Smith when debating whether a pipe which had been struck could stay in place for some time before failing. The suggestion of Mr Goring was that if anything was dislodged it could cause the pipe to fail when it came under the strain of a surge in the pressure of the town's water mains.

[118] It was the evidence of Mr Hesse was that in forty years of experience in the sprinkler industry he had never seen a failure like this. He expressed the view that the jockey clamps, threaded pipe and metal band used in the installation were very common in the sprinkler industry. His view was that once a pipe had been up for a week it would not just fail without a force being exerted on it. Something must have happened to cause it to fail, whether that be a water surge acting on an already weakened system or something else.

[119] Dr Bemont was of the view that whilst there were a number of possibilities which could have caused the failure of the pipe, the most probable one was a forklift strike. In his view the evidence of the marks on the underside of the truss and in particular the deformation of the teardrop shaped steel band holding the pipe were evidence of this having happened at some stage. Dr Bemont was of the view that it was almost certainly a paper load which struck the pipe causing deflection and there was a possibility that the pipe could have rotated in the Klambon groove. At some stage the whole thing would come apart. In his view this would have happened

within a few seconds. Although this would usually be the case, it was possible that a previous collision with a forklift or its load could have caused the failure, particularly if corrosion of a cracked jockey clamp or other part had occurred. Although he had initially been sceptical of the concept of a delayed failure, at the end of his evidence Dr Bemont seemed to warm to the idea.

[120] It was assumed during the leading of the experts and cross-examination of them that when the pipe failed, one or more lengths of the pipe fell to the floor of the warehouse. This was not, however, the evidence of the eye witnesses to the incident. It was the evidence of Sagren Adikanny that he did not see any pipes on the floor. His view was that when he looked at the pipes they were still hanging although they had parted.

[121] I have considered all the evidence and the various theories as to the cause of the pipe failure. I am of the view that:

- a) A forklift strike and an instantaneous failure was not the cause of the failure of the pipe. The evidence of the witnesses on site at the time of the incident puts paid to that theory.
- b) A failure caused by a negligently installation also seems unlikely because the system had remained up for five days after installation. The evidence of the experts does not point to a manifestly poor installation method or the use of defective or grossly inadequate hanger systems. Neither Mr Reabow nor Professor Smith could point to a single negligent act on the

part of the of the defendant's employees as a probable cause of failure.

The indications of failure of the system are not suggested to demonstrate a gradual continuing slide to failure as a result of the factors.

- c) A delayed failure pursuant to a forklift strike is more probable than any of the other suggestions. That could have occurred at a time before Sagren Adikanny came on duty.

[122] In the circumstances, the plaintiff has not proved the negligence of the defendant in the installation of the pipe or the use of inadequate hanger systems. As the defendant is not alleged to have been responsible for any other negligent act, no inference of negligence arises from the failure of the pipe. The *res ipsa loquitur* doctrine is of no assistance to the plaintiff in these circumstances.

[123] I accordingly make the following order:

The defendant is absolved from the instance with costs, such costs to include those consequent upon the employment of senior counsel.

Dates of hearing: The 10th to the 13th March 2014 and the 6th to the 9th June 2016.

Date of judgment: The 12th July 2016.

Counsel for the Plaintiff: A K Kisson Singh SC (instructed by Norton Rose Inc)

Counsel for the Defendant: J C King SC (instructed by Garlicke & Bousfield Inc).