CASE NO356/98

IN THE SUPREME COURT OF APPEAL OF SOUTH AFRICA

In the matter between

Daniël Mostert Appellant

and

Cape Town City Council Respondent

BEFORE: SCHUTZ, SCOTT JJA and MTHIYANE AJA

HEARD: 21 August 2000

DELIVERED: 7 September 2000

W P SCHUTZ

Negligence - burst water main - cause uncertain - inappropriateness of *res ipsa* reasoning - extent of municipality's duty to prevent damage to property - insurance - pressure testing - replacement - cost of compared with damage done - wrongfulness apparent if negligence proved - which it was not - new evidence refused.

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J U D G M E N T

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SCHUTZ JA:

[1] The key issue is whether the appellant ("Mostert") has proved that the respondent, the Cape Town City Council ("the Council"), was negligent in regard to its 62 km water pipeline which leads from the Steenbras reservoir to the Molteno reservoir situated above the city. The main negligence relied upon is either not replacing large parts of the pipeline, or not regularly testing it under pressure. An alternative contention is that the Council was negligent in not insuring itself against claims by property owners. The careful but succinct judgment of Tebbutt J, *a quo,* makes it unnecessary for me to provide the parties with a repetition of the details

of the evidence. I shall confine myself to an outline.

[2] This two foot six inch pipeline (762 mm) is made up of some 17600 cast-iron pipes, each weighing about two imperial tons, joined by spigot and socket joints sealed with lead. Their thickness ranges from 27/32" (21.4mm) to 1 3/16" (30.2mm), depending on water pressure from place to place. For almost its entire length the pipeline is buried underground at various depths. Originally it was used as a trunk line delivering "raw" water to the Molteno reservoir. Later it was altered into a distribution line, with smaller lines leading treated water out of it along its length. Some 37 of its 62 kilometres lie under roadways in built-up areas. Much of it runs under Voortrekker Road, a main arterial thoroughfare bearing traffic through the northern suburbs of Cape Town from Belville towards Cape Town, and passing through the suburbs of Parow and Goodwood. Voortrekker Road carries large volumes of traffic, including many buses, trucks and other heavy vehicles. The significance of load imposed on the pipeline was a much debated question in

the trial. The fact that the line runs through built-up areas means that, depending upon the topography along its length and the ability of the stormwater drains to carry off water, a burst in the main may lead to substantial damage to property.

[3] In the 1970s the state of the pipe was considered such that it was worthy of being coated with an internal cement lining in order to limit further corrosion. Cement lining is an expensive procedure which is not undertaken unless a pipeline is regarded as basically sound. This lining was done between 1974 and 1982. The process involved cutting open 150m sections and cleaning out internal corrosion which had accumulated over the previous more than 50 years, with a scraping device pulled through the pipeline. This process may have damaged the pipeline at isolated spots. After each scraping the 150m section was inspected visually for soundness and then the cement lining was applied.

[4] In 1981, after a burst in the pipeline, Professor Ball, a metallurgist, was asked to examine specimens in order to determine whether corrosion had reached the

point where the pipeline was nearing the end of its useful lifetime. His conclusion was that the metallurgical condition of the cast-iron was good and did not account for the failure. Some extraneous impact or soil movement must have been the cause of the cracking. Records pertinent to this test are largely non-existent and the details are lost. But what is clear is that the Council officials were concerned about the burst, considered whether the pipes had corroded to an undue extent, approached an expert to examine the question and obtained an answer favourable as to the state of the pipes. Professor Ball explained that the object of his tests was to eliminate corrosion as a cause of fracture. He was not asked to conduct a wider test to ascertain whether the pipeline was suspect in some other respect, or to enquire into what may have caused the extraneous impacts or soil movements. Mr du Plessis a consulting engineer called on behalf of the Council readily conceded that a wider investigation would have been desirable, but he was not asked what should have been investigated. Whether any such investigation would have

produced anything of value is a matter for doubt, particularly in the light of the inconclusivity of investigations made in the 1990's before the trial. What emerges is that the Council's employees were well aware of how extraneous impacts or soil disturbances may have been caused, but this awareness was of no real help in finding solutions. In the result Mostert, as plaintiff, has failed to establish that further investigation in 1981 would have led to the prevention of later bursts.

[5] On 18 December 1990 there occurred a burst that has led to this case. It took place under Voortrekker Road in Parow. Extensive flooding of neighbouring premises resulted, including Mostert's furniture shop, Furni-Scene. He claims that damage to stock, for which he holds the Council liable, amounted to R307 458. Quantum and liability were separated at the trial and the former stood over. Questions arise as at the cause of the burst, its foreseeability and the extent of the Council's duty to have taken steps to prevent it or to compensate loss consequent upon it.

[6] The stand of the witnesses for the Council is that, although the pipeline has suffered some corrosion since it was inaugurated as far back as 1921, so that the metal wall has been somewhat thinned, it is still sound, still serves its purpose, and will continue to do so for many years to come. In the words of one Coetzee, who was until his retirement senior superintendent of reservoirs and trunk mains, "it's a great pipe." Professor Ball examined further specimens from the pipeline in 1994 and concluded that "it is a very good water main which is performing well." Coetzee's training was as a fitter and turner. Over his 40 years experience with the pipeline he has always found it to be of sound, high quality cast-iron. The Council's case is that the bursts over the years for which no definite cause has been determined, are attributable either to randomly spaced imperfections in the cast-iron inherent in its nature, which lead to failures at unpredictable places and intervals; or to some force applied to a pipe as a result of a variety of possible events, some of which will be mentioned later. Mostert's case on the other hand,

(not always fully supported by his witnesses, as will be seen) is that the pipeline has reached the end of its useful and risk-free life, so that either it must be replaced, or some additional precautions must be taken to avoid damage to property beside the road. The initial list of suggested precautions was a long one. It shortened as the case proceeded. Broadly speaking, the argument is that corrosion and load stresses imposed by contemporary heavy traffic (heavy in both senses), when compared with those of 1921, have made the pipeline as a whole sub-standard (or at least those parts where it lies under a road).

Statistics

[7] A main argument advanced by two of Mostert's witnesses needs to be dealt with at the outset. It has to do with statistical probability. It was advanced both by Professor Rooseboom, a civil engineer, and Professor van Rooyen, a metallurgist specialising in metal fatigue. Neither is a statistician. In the appeal it was abandoned by Mr Smit SC, for Mostert, but was persisted in by his junior, Mr van

Rooyen, in reply. Whereas the pipeline is 62 km long, it was statistically significant, said the professors, that three unexplained bursts occurred over a period of four years (spanning 1979, 1981, and 1983), on a stretch of 11 km, where the pipeline lies beneath or beside Voortrekker Road, under tar. Using a "moving average", Professor Rooseboom contended that, as these were the only unexplained bursts during the four years 1979 to 1983, a non-random pattern was revealed. This needed explanation. When one looked for an explanation, it was to hand. All these bursts occurred under tar. Ergo, the villain was traffic. I have somewhat simplified the argument, but this is what it came to. The conclusion so reached largely underlay the evidence of both professors. Corroboration for their conclusion as to the cause of the bursts was then sought in a variety of directions. Furthermore it was contended that, once the pattern and therefore the probable cause of the bursts had become apparent by 1983, the Council should have heeded the statistical alarm bell and taken appropriate action to avoid further bursts.

[8] The validity of this reasoning was challenged by Professor Underhill, who established, in my view, that the facts relied upon were consistent with random occurrence. As experience of life and a tenuous grasp of mathematics teaches one, the theory of probability does not always match the legitimate expectations of common sense. Professor Underhill, who is a statistician, was instructed that four bursts had occurred for which no cause could be determined, in 1972, 1979, 1981 and 1983. He used a computer program to generate four random bursts over a 62 km pipeline 10 000 times, and found that in 17.1% of the trials three bursts were clustered over a distance of 11 km over four years. This is about the same chance as throwing a six with a dice. It is generally accepted, he said, that for a chance to be statistically significant, in the sense of indicating that the result is non-random, it must be below 5% (as compared with 17.1% in the tests). Accordingly no significance could be attached to the proximity in space and time of the three bursts between 1979 and 1983. They could have occurred at random. The limited

nature of this conclusion needs to be stressed. It does *not* mean that the bursts were random in their occurrence. It only means that they could well have been random, so that no *statistical* support is afforded to Mostert's case by the seeming coincidence of the bursts in space and time. As to Professor Rooseboom's method of using a "moving average", Professor Underhill regarded this use as unscientific. It was wrong to have selected the very area where breaks had occurred and then apply the theory of probability to it. This was like betting on a horse race after it has been run. Statistics may therefore be put on one side.

[9] An even more simplistic argument put forward by Rooseboom and van Rooyen, that the pipeline is demonstrated to be sub-standard because it has burst without apparent cause on several occasions, may also be put on one side. The facts yet to be discussed reveal that there is a variety of possible causes for these bursts, some of which at least are not indicative of the inadequacy of the pipeline as a whole, or certain definable lengths of it. Notwithstanding this, both professors

continued to display a strong attachment to this simple theory.

Possible Causes

[10] I turn to the question; what may have been the causes of the hitherto unexplained bursts? There was agreement that failure may have stemmed from relatively small cracks in the cast-iron. These result from gas bubbles trapped in the material during the casting process. The existence of cracks does not in itself point to manufacturer's error. It is, even without error, a characteristic of cast-iron. Professor Ball's opinion of the further specimens of pipeline examined in 1994 was, as in 1981, that the pipes were in good shape metallurgically. The reason for the bursts over the years (in addition to the extraneous impact or soil movement mentioned in 1981) may have been the presence of a relatively small number of "active" cracks, that is cracks of a length sufficient such that they might propagate under the designed working stress, ultimately leading to bursts. There is no way of knowing where each "rogue" pipe may be or whether or when it may fracture.

And even if there were a few batches with defects due to errors in manufacture, there is no knowing how the individual pipes were dispersed over the length of the pipeline. (The pipes were manufactured in Scotland and then shipped by sea and land during and after the First World War. With the various transshipments it cannot be assumed that a batch would remain united and end up end to end). According to the professor, active cracks leading to failures scattered in space and time were a price that was paid when choosing cast-iron over steel. Steel is less brittle and less liable to burst, but on the other hand, it was more expensive than cast-iron at the time, and is more subject to corrosion.

[11] Professor van Rooyen went a discrete step further than Profesor Ball. His view was that what had happened was that "passive" cracks (too short to propagate to the point of fracture under designed loads) had developed into "active" cracks. The reason for this was that modern traffic imposed stresses on the pipes which they were not designed to bear. Loads imposed time and time

again (cyclically) might deform the pipes recurrently and cause metal fatigue, leading to the spreading of the cracks. This process might have been helped on by corrosion. According to this theory, at least that part of the pipeline which lies under heavily trafficked areas is below modern standards. Professor Ball rejected the notion that the propagation of passive into active cracks was the cause of the failures. He remained of the view, despite Professor van Rooyen's evidence, that the causes were either the propagation of active cracks or some extraneous stress imposed upon the pipes. Otherwise the pipes were quite strong enough for the job. Professor van Rooyen claimed that Professor Ball had failed to take metal fatigue into account. This is not correct. Metal fatigue was allowed for in the safety factor to which I shall now refer.

[12] Apart from examining the state of the metal, Professor Ball concluded that a large safety factor had been built into the specification of pipe strengths. It was left to Mr Ramsay, the Council's principal engineer for design and planning, to

calculate the overall actual safety factor in regard to imposed loads. I shall return to his evidence later. A great deal of evidence was given as to what this safety factor really was.

[13] Professor van Rooyen placed reliance upon a 1957 American specification for laying underground pipelines, which recommend a safety factor of 2.5 (ie the pipes should be two and half times as strong as the strength needed to withstand the assumed stresses). According to van Rooyen's calculations the actual safety factor in the pipeline was considerably less than 2.5, so that it was "a really borderline case." This calculation involved certain assumptions. An important one was the nature of the "field conditions". By this is meant, the bedding of the pipe. For instance, a tamped sand bed shaped to fit the pipes affords the best support. Also important, as far as traffic loads are concerned, is the depth at which the pipe is laid. The deeper the pipe the more are traffic stresses above it dispersed. Ramsay recalculated the safety factor, taking into account the actual bedding

conditions (as observed by various Council witnesses over the years), the actual depths at each burst, and the reduction in thickness of the pipe due to corrosion. His conclusion was that the safety factor was well over the recommended factor of 2.5. In addition the actual strength of the metal (as tested) considerably exceeded that assumed in the specification. This provided a further cushion, or safety factor. Mr du Plessis was of a similar view. He was of the opinion that even with the thinned wall, the safety factor was 2.6, which meant that metal fatigue was not the reason for failure.

[14] Professor van Rooyen made an unconvincing attempt to keep his theory as to the propagation of passive into active cracks alive after Mr Ramsay's demonstration of the actual safety factor had undermined the professor's calculations (which had also included an error). I have mentioned already that he made the unfounded suggestion that Professor Ball had ignored metal fatigue. He then suggested that the 1957 American specification, on which he had based his

evidence, was deficient in that it also did not make allowance, or sufficient allowance, for metal fatigue caused by cyclical traffic stresses (although he once contradicted himself on this point). He did not fare well in cross-examination, as the American specification is not based only on theoretical calculations, but also upon practical experience, which includes cases of pipelines under roads. Under pressure in cross-examination, at one point the professor fell back upon the proposition, already mentioned, that the safety factor was proved to be insufficient simply because there had been failures. In the result it seems to me that the specification chosen by Professor van Rooyen himself, when properly applied works against his theory of the propagation of passive cracks.

[15] The principal difference between Professors Rooseboom and van Rooyen on the one side, and Professor Ball and Messrs Ramsay and du Plessis on the other, as may be seen, is that, whereas the latter group sees the principal cause of fractures to be original pre - 1921 cracks leading to bursts at unpredictable times

and places; the former group sees the principal cause as traffic stresses imposed on a pipeline which is no longer strong enough to bear them. In other words the design strengths of 1919 were insufficient for the actual conditions of the 1970' s and 1980's. Reference was made to the bathtub curve. The image is of a lengthwise section through a bath. The horizontal axis is time, the vertical events. The incidence of events is high at the beginning and the end of the lifetime of the subject. Thus a person might need the attentions of a doctor frequently in early childhood and old age, but less in between. Similarly a motor car's need of repairs. Also a pipeline may have many failures after installation and again at the end of its lifetime, as corrosion reaches a terminal level. The Mostert counsel claim that the pipeline is beginning to mount the final upward curve (as will appear below, the Mostert witnesses are less adamant). The Council representatives insist that it is still on the level plain. Professor Ball's view is that metallurgically the pipeline is not at the end of the bathtub curve. Ramsay is of the view that it was

conservatively designed and installed and is still in good condition. Bad construction is a possible cause of failure but there is no evidence of it. When regard is had to the safety factor, which makes allowance for traffic stresses, traffic is not the cause.

[16] Both groups recognize that there may be other causes of failure, the existence or non-existence of which is difficult or impossible to establish. Thus, apart from cracks formed in the casting process, handling damage may have been caused on the voyage from the foundry in Scotland to the site, or upon installation on site. As mentioned already, bad bedding can impose unusual stresses, leading to failure. As far as the observations of Council officials who gave evidence go, observations made when repairing, cement-lining, deviating or connecting the pipeline over the years, the original bedding conditions were good. But this does not exclude the possibility of subsequent damage. For instance, an undetected leak at a joint may erode the bedding. The whole pipeline is patrolled once every two days, but this

does not eliminate this possibility. Similarly damage may be caused to the bedding by contractors not under the Council's direct control working near the pipeline. An example is the laying of a telephone cable. The pipeline passes through the jurisdictions of several other municipalities, which complicates its protection. This despite the Council's inspections and its rules as to notification of such works, so as to allow its own supervisors to be present. Another possible cause is a heavy object falling off a truck. Certain of the Council officials were of the view that the vigorous scraping of the pipeline prior to its lining with cement may have damaged it and been a cause of bursts. Barnard, senior superintendent of reservoirs and trunk mains (he is Coetzee's successor) had a "gut feeling" that this was the cause of the two Parow bursts (presumably 1981 and 1990). Ramsay suspected the same in respect of the 1981 and 1983 bursts. (Knock those out and how do even the van Rooyen probabilities look?) Steps taken to preserve the pipeline by lining it may thus have damaged it at isolated places. So that, all in all, there are possible

causes enough.

[17] Before pursuing the matter of causation further it is desirable to set out the history of pipe failures. The Council's record of bursts since 1972 is complete, if sometimes lacking in detail. Before that date the records are sporadic. Known failures occurred in 1950, 1963, 1964, 1970, 1972, 1974, 1979, 1981, 1982, 1983, 1987 and 1990. Several of these may be eliminated from the discussion, because a cause other than pipe failure has been established, or cannot be excluded. The 1964 failure was due to defective couplings. Nothing is known of the 1970 failure other than the date and place of its occurrence. The 1974 burst was due to damage caused by a pipe lining contractor. The 1982 burst was due to a mistake made by the crew pressuring the main. That leaves 1950, 1963, 1972, 1979, 1981, 1983, 1987 and 1990.

[18] To take these in turn: all that is known of the 1950 failure is that it occurred under Voortrekker Road. The record of the 1963 failure shows only that it

occurred near Firgrove Station, Firgrove, that it was a pipe failure, and that the condition of the adjacent pipe was “good.” All that is known of the 1972 failure is that it occurred under a broad island dividing the main road, i e it was not subject to traffic load. The 1979 failure is interesting. It took place not under Voortrekker road, but under a tarred cul-de-sac beside it, called Artreco Road, leading to the Epic factory in Maitland. The pipe was buried 6.6 feet beneath the surface. The 1981 failure took place in Voortrekker Road, off de la Rey Road, in Parow. It was this burst that led to the submission of test samples to Professor Ball. The depth of the pipe is not known. The fracture lay under a major intersection. The 1983 failure took place at the corner of Voortrekker Road and Loop Street, Maitland, but not in the intersection. The depth of the pipe was 3 feet. Ramsay offered it as his view (as already stated) that the burst may have been caused by the cement liner who had worked on the section not long before. The 1987 failure occurred in the veld at Faure some 10-15m from the tarred road. The depth of the pipe was four

feet. Finally, the 1990 burst took place under Voortrekker road, Parow at a depth of 3.34 feet. Mr Flower is a professional engineer employed by the Council. He inspected the site of the burst and found a fragment of pipe which, because of differently hued corrosion stains, suggested that the cause of this failure had been an old crack, about 200 mm long (which would qualify it as an “active” crack).

[19] The approximate distances of these bursts from the Molteno resevoir are:

1983	7km
1979	8"
1990	17"
1981	18"
1972	33"
1987	40"

[20] The grouping of the 1979, 1981 and 1983 bursts over 11 km may be seen in the first four items. What should also be observed is the sometimes clustering of bursts, as also their wide dispersal over the length of the pipeline.

[21] Whilst disavowing any statistical approach, it is significant to notice that

some of these failures exhibit features which point away from traffic load as their cause. Both the 1972 and 1987 bursts took place under a surface not used for traffic. Moreover, the latter one was covered by four feet of overburden, so that traffic load would largely have been dispersed. The 1979 burst can also be classed with these two. True it was under tar (for what that is worth) but beneath a cul-de-sac, where neither fast nor frequent traffic would be expected. And it was relatively deeply buried at 6.6 feet. (Flower's uncontradicted evidence was that laying a pipe about a meter under the surface was standard practice and was used in pipe laying in the Council's system and in many other major pipe systems). It is true that a learner steam-roller driver might have used the cul-de-sac for practice, but that seems unlikely. So that there are three instances where it does not appear that traffic load was the cause of failure. What was the cause in these cases? Another feature is that there is not a regular pattern of bursts occurring under important intersections, which bear a particularly heavy traffic load. One must look not only

at the historical bursts, but also at the main intersections where bursts did *not* occur. Du Plessis gives as an example Vanguard Drive, which carries heavy traffic. There have been no bursts under this intersection.

[22] For all these reasons I do not think that Mostert has proved on a balance of probabilities that traffic stresses caused the 1990 burst, even though such stresses are an important suspect. One simply does not know. I do not, therefore, agree with Tebbut J's conclusion that "on the probabilities the most likely cause of such failures was the effect of traffic loading on the pipeline at certain points causing passive inherent defects in the pipe to be propagated into active defects leading to pipe fracture."

Possible Remedial Measures

[23] But I do agree with Tebbutt J that, assuming his finding as to causation was right, Mostert failed to show that there were remedial measures available to the Council, which in all the circumstances it was under a duty to have taken and which

it did not take, from 1983 onwards.

[24] The suggestions as to what the Council should have done were quite numerous. During the course of the trial several of them were abandoned. They tended to be tentative, both as to exact method and cost. To an extent this is understandable. It would be expecting much of a plaintiff in a case like this to have him fully design a variety of alternative measures and cost them accurately. Without laying down any standard of proof in this regard, I shall approach the matter on the basis that if Mostert has put forward a proposal within the realms of "practical politics", it may behove the Council to parry the proposal. After all, the Council knows the facts about its pipeline, and has the facilities and indeed the duty to consider such matters, which affect its ratepayers.

[25] As to the abandoned proposals, I shall do little more than mention them. Magnetic particle inspection in order to locate cracks from the inside of the pipe could not be carried out, because of the intervention of the cement lining.

Encasement of the pipes in concrete was abandoned, mainly because the cost would not have been much less than that for replacement. A proposal to place concrete slabs over the pipes was also dropped. The internal lining of the pipeline with PVC piping was not persisted in as a remedy, mainly because of the cost and the fact that the water flow would have been reduced drastically. The installation of an automatic valve closing system, relied on at the trial, was not pursued in the appeal.

[26] That left insurance to be taken out by the Council, regular pressure testing to locate weak spots and replacement with steel pipes over the whole or a large part of the 62 km of pipeline.

Insurance

[27] The engineering witnesses for Mostert expressed the view that in planning its activities the Council should have had regard to the cost to particular ratepayers of activities - such as reticulating and selling water - which benefited the authority

and the general body of ratepayers. The cost to individuals should be shared by all, it was argued. Whatever the philosophical merit of this suggestion may be, the matter must be decided according to the common law (no resort was had to the Constitution). The Council cannot insure unless it has an insurable interest. It has no such interest unless it is liable to someone for damage caused by the escape of its water. It is not liable unless it has acted negligently or deliberately. To hold otherwise would be to impose an absolute liability on the Council - to make it an insurer. That is a matter for the legislature, not the courts. In the result the insurance proposal lacks a basis in law.

Pressure Testing

[28] The proposal put forward by Professor van Rooyen was that at "regular intervals" sections of the pipeline should be subjected to pressures 50% more than normal, in order to seek out defective pipes with a view to their replacement.

[29] Mr Ramsay, the only pipeline expert called on the subject, regarded the

proposal as both impractical and dangerous, dangerous in that such tests could damage the pipeline. First impracticality. Because it serves as a distribution line, a test would entail shutting off the valves in pipes leading out of it, which would lead to affected areas being without water. Moreover, the seals provided by valves that would have to be closed were so imperfect that a proper test was not feasible. As far as cost was concerned, testing would have to go on all year in order to complete one test, as it was not practicable to test more than a kilometre at a time and tests would presumably have to be performed over week-ends when there was less traffic. An additional problem was, at what intervals should tests be performed? Van Rooyen was of no real help on this practical question and Ramsay did not know what the answer to it was. On top of all this (and this is the danger aspect) Ramsay was of the view that such tests could have a deleterious effect, in that they could cause joints to leak, leading to erosion of the bedding, with consequent possible damage to pipes. Van Rooyen had no effective counter to

these objections, and I consider that the court *a quo* was correct in rejecting the proposal as a solution.

Replacement With Steel Piping

[30] The proposal was that the Council should have replaced the whole or at least a substantial part of the pipeline with steel piping. This proposal does have the virtue of presenting a practical engineering solution. The question is whether it should have been adopted, given all the circumstances, particularly the cost of installation as compared to the likelihood and cost of damage should the old pipes remain in service.

[31] The proposals as to the extent to which the pipeline should be replaced were imprecise and varied from time to time. In his two expert's summaries Rooseboom did not propose replacement at all. In his evidence he suggested replacement where the risk was great, but this only if no other remedy could be found, or if the Council failed to contrive a means of compensating affected owners. What he did not

propose was wholesale replacement. Van Rooyen conceded that he did not know where the pipeline was on the bathtub curve, and that replacement was not called for unless one knew that one was on the final upward curve. No witness unequivocally stated that the whole pipeline needed replacement. In argument Mr Smit suggested that the Council should launch an investigation to ascertain the built-up areas in which the stormwater system might not cope with a burst and replace in those areas.

[32] The cost of replacing the whole was estimated by Ramsay to be R118 000 000 in 1989 terms and R93 000 000 for the section under roadways in built-up areas (the cost per kilometre is higher in such areas). As against this cost, Flower stated that, except in 1981 and 1990, the stormwater system coped with the bulk of the water. Only in those years was damage caused to property other than that of the Council. The damage in 1981 does not appear to have amounted to a great deal (possibly of the order of R140 000). As already mentioned Mostert's claim (1990)

is for R307 458, although his was not the only property damaged. It is clear that the loss so far suffered by property owners adjacent to the pipeline in built-up areas is far less than even the annual cost of servicing and paying off a loan obtained to pay for a new pipeline, never mind the cost of the pipeline itself.

[33] The classic test for negligence is stated in *Kruger v Coetzee* 1966 (2) SA 428 (A) at 430 E-G, as follows:

> "For the purposes of liability *culpa* arises if -
>
> (a) a *diligens paterfamilias* in the position of the defendant
>
> (i) would foresee the reasonable possibility of his conduct injuring another in his person or property and causing him patrimonial loss; and
>
> (ii) would take reasonable steps to guard against such occurrence; and
>
> (b) the defendant failed to take such steps."

[34] Requirement (a)(i) is satisfied. The Council could foresee in 1983 that pipes might burst again, causing property damage and consequent patrimonial loss. But as Holmes JA pointed out (at 430 G):

> "Requirement (a)(ii) is sometimes overlooked. Whether a *diligens paterfamilias* in the position of the person concerned would take any guarding steps at all and, if so, what steps would be reasonable, must always depend upon the particular circumstances of each case."

[35] It is certainly not the position that the Council has adopted an attitude of indifference, content that damage might fall upon the luckless. Active steps are taken to prevent or minimize damage. I have referred to the two-daily patrol, aimed at detecting leaks and activities near the pipeline which might cause it harm. In addition, repair crews and engineers are on 24 hour standby, to deal with bursts as expeditiously as possible when they should occur. But the question is whether the Council was obliged to go further and replace a substantial part of the pipeline. In the words of Prof J C van der Walt, quoted from *Lawsa* in *Ngubane v South African Transport Services* 1991(1) SA 756 (A) at 776 I:

> "There are . . . four basic considerations in each case which influence the reaction of the reasonable man in the situation posing a foreseeable risk of harm to others: (a) the degree or extent of the risk created by the actor's conduct; (b) the gravity of the possible consequences if the risk of harm

materialises; (c) the utility of the actor's conduct; and (d) the burden of eliminating the risk of harm."

[36] When considerations (a) and (b) are weighed against consideration (d), affordability and proportionality between the loss which may be suffered by occupiers of land and the cost of replacement to the Council must be examined: *Administrateur , Transvaal v van der Merwe* 1994(4) SA 347 (A) at 363 C-H (the enquiry in that case was conducted in the context of wrongfulness, but that does not affect the principle or its application).

[37] Returning to the facts of this case, I agree with Tebbutt J's conclusion that it would not have been reasonable to have expected that the Council should have expended either R 118 000 000 or R 93 000 000 in replacing the pipeline between 1983 and 1990. Nor do I think that it is to be expected to spend a lesser, but still large sum on replacing pipes where the risk of flooding is regarded as greatest (no easy or certain enterprise to determine where).

[38] Accordingly I do not think that Mostert has established that the Council should have taken further steps to guard against flooding losses.

[39] I would add, however, that if Mostert had established that the pipeline was no longer in the plains but on the final upward slope of the bathtub curve, or if in the future it should become apparent to a skilled observer that that has happened, very different considerations might apply. In such a case it might be unreasonable not to accept the cost of replacement.

Res Ipsa Loquitur

[40] Mostert's counsel have sought to bolster their client's case by resort to the form of reasoning by inference that goes under the label *res ipsa loquitur.* It is described in Hoffmann and Zeffertt's *The SA Law of Evidence* 4 ed at 551 in this way "If an accident happens in a manner which is unexplained but which does not ordinarily occur unless there has been negligence, the court is entitled to infer that it was caused by negligence." Reliance has been placed on two American

decisions, *George Foltis Inc v City of New York* 21 NYS 2 800 and *Adam Hat Stores v Kansas City* (M) 316 SW 2d 594. In these cases *res ipsa loquitur* reasoning was applied. A passage in the *George Foltis* case was quoted in the *Adam Hat* case and in the heads filed on behalf of Mostert to the following effect:

> "Cast-iron water mains which are properly laid four feet underground ordinarily do not break, any more than ordinary trains are derailed, missiles fly, or elevators or walls fall; and when such a main does break the inference of negligence follows in logical sequence."

[41] On the evidence before us cast-iron pipes properly laid do sometimes burst, for the reason given by Professor Ball - slow propagation of active cracks - and for a variety of other reasons not necessarily consistent with negligence on the part of the pipe's owner. Professor van Rooyen conceded that some of the bursts may have been caused by defects lying dormant in the pipeline since 1921. When the *George Foltis* passage was put to Professor Ball he said that he disagreed with it, because, as he said, cast-iron pipes all over the world do break, very occasionally.

This evidence is not contradicted. Accordingly *res ipsa* reasoning is not helpful in this case, either because its first requirement is lacking ("an accident . . . which does not ordinarily occur unless there has been negligence"); or because, if an initial inference could be drawn, it has been rebutted by the evidence.

Conclusion On Negligence

[42] Viewing the evidence as a whole I am not persuaded that Mostert has proved, what in the final analysis he had to prove, that the Council was negligent in failing to take further steps to prevent the burst in 1990.

Wrongfulness

[43] I have approached this case as one raising questions of negligence, whereas an unbending adherence to logic might dictate that wrongfulness is the prior enquiry, and the question of the reasonableness of expecting the Council to replace the pipeline might have been dealt with under that heading. Logic is one thing, utility sometimes another. As was pointed out by Scott JA in *Sea Harvest*

Corporation (Pty) Ltd and Another v Duncan Dock Cold Storage (Pty) Ltd and Another 2000 (1) SA 827 (A) at 837 H, in many if not most delicts the issue of wrongfulness is uncontentious, as the action is founded upon conduct which, if held to be culpable, would be *prima facie* wrongful. This is such a case. If the Council was negligent in not preventing the 1990 burst I have no doubt that the community's sense of what the law ought to be would demand that liability be imposed upon the Council (cf *The Municipality of Cape Town v Bakkerud* (SCA) unreported 29.5.2000). After all, the Council leads across densely populated land a large volume of water under pressure, and then exercises exclusive control over it. Whatever its contrasted social utility, this is the equivalent of walking ones tiger across the forum.

New Evidence

[44] After judgment had been reserved but before it had been delivered, on 25 June 1995, within at most a few hours of each other, three further bursts occurred

under Voortrekker Road, two in Parow and one in Goodwood, In two of the cases, and probably in the third also, an old crack was found in the remaining fragments. Mostert applied before Tebbutt J to have the Council reports reflecting these facts accepted as evidence. Mostert's attitude then was that there would be no need to re-open the trial after such acceptance, but that if it was considered necessary, that would have to be done. The Council's attitude was and is that if the reports are admitted the trial will have to be re-opened.

[45] Tebbutt J had a discretion to admit the evidence (see eg *Oosthuizen v Stanley* 1938 AD 322 at 333, *Mkwanazi v Van der Merwe and Another* 1970 (1) SA 609 (A) at 616 B-617 D). The principles guiding the exercise of such a discretion are set out in these cases.

[46] I am of the opinion that Tebbutt J was correct in refusing to admit the further evidence. Although Mostert surmounted the first hurdle (why did he not lead the evidence before? - because it did not exist), he failed to clear some others. First,

as these bursts occurred in 1995 they fail to throw any light on one of the main issues - what should the Council have foreseen before 1990? Secondly, in two instances, and probably in all three, the state of the fractures appears to be consistent with the Council's case, that the probable cause of past failures was the propagation of old active cracks. The evidence does not, therefore, promise to alter the result of the trial. Thirdly, there is the general need for finality in judicial proceedings. If the reports had been admitted it is clear that the court would have had to have acceded to the Council's request to re-open the trial. At the re-opening one would expect that the first contention would have been that there were not in reality three new bursts, but only one, the second and third following shortly after the first because of steps taken to isolate the first. Then there would no doubt have been evidence as to bedding conditions, and so forth, *ad nauseam*. The Council was entitled to have an end to these already very protracted proceedings, and Mr Smit, for Mostert, fairly conceded that if the trial would have to be re-opened, his

client also would rather have a final decision based on the existing record.

[47] The appeal is dismissed with costs, such costs to include those consequent upon the employment of two counsel.

W P SCHUTZ
JUDGE OF APPEAL

CONCUR
SCOTT JA
MTHIYANE AJA