IN THE LABOUR COURT OF SOUTH AFRICA

Case no: J 649/21

Reportable

In the matter between:

KANGRA COAL PROPRIETARY LIMITED	**Applicant**
and	
MINISTER OF MINERALS AND ENERGY	**First Respondent**
THE ACTING PRINCIPAL INSPECTOR OF MINES: MPUMALANGA PROVINCE	**Second Respondent**
THE CHIEF INSPECTOR OF MINES	**Third Respondent**
DRIEFONTEIN COMMUNITY FORUM	**Fourth Respondent**
BLOCK C EXTENDED COMMITTEE	**Fifth Respondent**

Application heard: 25 June 2021 (via Zoom)

Delivered: 5 July 2021

Summary: Assessment of the standard of 'significant risk' of blasting operations to take account of both the likelihood and consequences of injury to persons or damage to property in applying Regulation 4.16(2) of the Mines Health and Safety Act 29 of 1996.

JUDGMENT

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WHITCHER J

[1] This is an appeal brought under section 58(1) of the Mine Health & Safety Act 29 of 1996 ('the MHSA') which provides that any person adversely affected by a decision of the Chief Inspector of Mines, either in terms of section 57(3) or in the exercise of any power under this Act, may appeal against the decision to the Labour Court. The appeal is opposed by the First, Second and Third Respondents.

[2] The appeal stems from an application that was made by the Appellant in terms of Regulation 4.16(2) issued in terms of the MHSA for written approval to conduct blasting operations within 500 metres of dwellings.

[3] It is brought on an urgent basis in terms of Rule 8 of the Labour Court Rules. Urgency is not in dispute.[1]

[4] The parties agreed that the enquiry is an appeal in the strict sense which involves a re-hearing of the merits but limited to the evidence or information on which the decision under appeal was given; and in which the only determination is whether the decision is right or wrong.[2]

Summary of Evidence and Argument

[5] Regulation 4.16(2) provides that:

(2) no blasting operations are carried out within a horizontal distance of 500 metres of …any place where people congregate or any structure, which it may be necessary to protect in order to prevent significant risk unless-

(a) a risk assessment has identified a lesser safe distance and any restrictions and conditions to be complied with:

(b) a written application is submitted to the Principal Inspector of Mines accompanied by the following documents for approval-

[1] The urgency lies in the fact that it appears that the viability of the Appellant and the continued employment of its employees depends on approval to mine the reserve in question and the viability of mining of the reserve is subject to tight time frames.

[2] See *V v Passenger Rail (PRASA) & Others* [2020] ZALCPE 6 (approved in *Bon Accord Environmental Forum v The Department of Mineral Resources & Others* Case No. J 2688/18 at para [50].

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(i) a sketch plan indicating the distance from the blasting area to the affected structures;

(ii) the risk assessment;

(iii) proof of consultation with the owners of the affected structures; and

(iv) restrictions and conditions.

(c) a written approval has been granted by the Principal Inspector of Mines; and

(d) any restrictions and conditions determined by the Provincial Inspector of Mines are complied with.

[6] The purpose of the aforementioned regulations is to provide a general safe zone set at 500 metres. Clear provision is made that, in the event of the absence of significant risk, that, written approval may be granted for blasting operations to take place within the 500 metre blast radius subject to compliance with regulations 4.16(2)(a) and (b) and the absence of significant risk.

[7] In this regard, the Appellant in its application to the Principal Inspector of Mines provided a risk assessment and various other reports.

[8] It provided a structural survey of the dwellings within the 500m radius. The dwellings in dispute between the parties are identified in the Appellant's application as R001 (which has seven structures and is located 225m from the site of blasting), R006 (which has four structures and is 400m from the site of blasting), R 007 (which has seven structures and is located 500m from the site of blasting), R009 (which has seven structures and is 383m from the site of blasting), R010 (which has two structures and is located 275m from the blasting site).[3] Thus the affected dwellings are situated 225, 275, 383, 400 and 500m from the blasting site. The structural survey of these dwellings reveal the following: the dwellings are made of brick and cement, save for R006 which are mud structures; all exhibit cracks in stress points such as doors, windows and wall joints; they were not built according to building regulations, including the

[3] As indicated above, R011 and R012 are no longer in issue because the Appellant stipulated in the present application that it will also relocate these two dwellings.

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foundation of R001; one of the structures on R001 is in a dilapidated state; R009 is made of poor quality cement and brick and also shows cracks from the beam to the bottom of the wall.

[9] The Appellant also provided for blast designs initially by Maxim Corporate Holdings, and subject to concerns raised by the Inspectorate, engaged the services of Epic Blasting and BME Omnia.

[10] From the aforementioned it appears that the first blasting design that was done provides for a specific charge mass and an indication of the impact respectively at 250, 300 and 350 meters from the blasting operations.

[11] Flyrock[4] was calculated to have a maximum estimated range of 98.89m.

[12] BME Omnia then further addressed the concerns in their design and indicated in its second blasting design that the PPV[5] at 140 meters would be 5.0 and that the estimated flyrock range decreased to 84 meters.

[13] BME / Omnia indicated that the maximum PPV at the mud house structures would be less than 6mm per second.

[14] The reports from the above blasting and explosive consultants recommended that due to location and state of the dwelling in question, the limit of ground vibrations should not exceed 6 mm/s and the blast should not exceed 125dB.

[15] The Appellant in addition to the aforementioned also states that it acts in terms of Standard Operating Procedures which provides *inter alia* for pre-and post-blast inspections to be conducted of the dwellings in issue and a total evacuation of all people during the time of blasting.

[16] The Appellant also concluded agreements with the affected households to monitor for and repair all damages caused to their houses by the blasting.

[17] Finally, the application included a stipulation that all dwellings within a 100m blast radius are to be relocated by the Appellant. In the course of the present

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[4] Flyrock is rock that is ejected from the blast site in a controlled explosion in mining operations. The term refers to rock that flies beyond the blast site, causing injuries to people and damage to property.

[5] As the blasting vibration excites a particle it moves about its point at rest in three dimensions, not in a straight line. A device measures the rate of the movement in three separate planes, thereby determining the velocity of the vibration. Air overpressure measured in units of Pounds Per Square Inch above the pressure of the air before the blast; or "airblast" measured in weighted decibels (dB).

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application, the Appellant extended this stipulation to dwellings that fall close to the 100m radius.[6]

[18] The Inspectorate[7] were willing to grant the necessary permission, conditionally that the Appellant also relocated the dwellings in issue to outside the 500 metre radius ('the relocation condition').

[19] It is best to set out in full the Inspectorate's written reasons for stipulating the relocation condition because this is the heart of the dispute in this appeal, and besides that which formed part of the Appellant's application, this is the only document from the Inspectorate in the record:[8]

> *"[Kangra] has a community that resides within the mining activity and various complaints were received by the office that their houses cracked because of Kangra's blasting.*
>
> *… [Kangra's structural survey of houses within the 500 metre radius] indicated at the time that most properties were built of low-quality material and some of the houses were built with mud. This implied that there was a high risk of these properties to deteriorate and might even collapse due to continuous blasting. It is the Inspectorate's view that the blasting will put the lives of the occupants of the houses within this radius at risk.*
>
> *From the blasting designs simulations submitted by Kangra, the Department was of the view that the blast will result in high airblast, ground vibration and fly rock risk.*
>
> *……*
>
> *…Kangra is required to adhere to and comply with Good Practice within South Africa when it comes to acceptable limits on blasting. This good practice governs ground vibration limits within South Africa."*

[20] The Chief Inspector went on to say that while the Appellant has concluded agreements with the owners of the dwellings to repair any damages caused by

[6] R011 and R012 which respectively fall 150 and 115 metres from the blasting zone.
[7] The Acting Principal Inspector who considered the application and then the Chief Inspector of Mines who decided the Appellant's appeal against the decision.
[8] They did not supplement the record with any other documents.

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the blasting, the agreements cannot override the Inspectorate's safety concerns as set out above.

[21] The Appellant was unwilling to comply with the relocation condition, arguing, as it still does in this appeal, that in its application to the Inspectorate it had demonstrated that while the first step in the process, namely the risk assessment indicated a high level of risk to the dwellings in question, it thereafter, based on the assessment, had comprehensive blasting designs and reduced charges developed to ensure that the blasting will not pose a significant risk to the dwellings and the safety of their occupants.

[22] Moreover, in arriving at their decisions, the Inspectorate raised no issues pertaining to the expertise of the blasting and explosive expert reports, nor had they challenged the validity or even accuracy of their reports. The Inspectorate at no time raised a dispute pertaining to the contents and methodologies, simulations and projections of the Appellant's reports.[9] Indeed, nothing was further placed in evidence in this appeal to refute the calculations, method, designs or simulations performed by the experts relating to blasting, the Inspectorate relying on the data and conclusions disclosed in these reports themselves to justify its declination.

[23] The essence of the Second and Third Respondents' case in their answering affidavit is based on the fact that the structures in issue are already in a weakened state and thus vulnerable to any blasting in the area, irrespective of the projected para-seismic movement (groundwaves). They regard the Appellant's agreements with the tenants to conduct pre-and post-inspections and to pay for damages to any structures caused by blasting as somewhat of a concession of the existence of significant risk to the safety of the occupants of the households in question.

[24] The high watermark of the Second and Third Respondents opposition during argument rested on contentions that the Appellant's own Risk Assessment indicated significant risk associated with blasting within a 500m radius. Specifically, the already weakened and substandard structures would be subjected to repeated stress through ground vibration, risking collapse and thus

[9] They accepted they are experts based on their years of experience in the specific field and business profiles.

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a risk to life and limb of the occupants of these structures. For the respondents, while the blasting measures the Appellant had put in place to limit ground movement reduced risk, it did not do so sufficiently. The risk to persons and property remained substantial, which the Appellant's own expert risk assessment calculations confirmed.

ANALYSIS OF EVIDENCE AND ARGUMENT

[25] The gravamen of the dispute in this appeal is whether there is significant risk to the structures and the persons residing in the identified structures; that is, those residing in the zone of 225 to 500 metres from the blasting site.

[26] The question is thus whether the Appellant in its application to the Inspectorate demonstrated the absence of significant risk to the safety of the occupants of the dwellings and to these properties themselves.

[27] The further question is whether the steps taken - and to be taken - by the Appellant during the blasting operations and as detailed in its application (the mitigating measures) proves the absence of significant risk.

[28] Of the three possible causes of risk to persons and property, I am satisfied that, on the evidence, fly-rock does not present a *significant* risk. Calculations by blasting experts show that the Appellant's blasting design will keep fly-rock well within the 100m range, thus not likely affecting any person or structure.

[29] The remaining two possible causes of risk are air blast and ground movement, measured in decibels and PPV (or mm/s) respectively. The expert evidence shows an attempt to mitigate the risks of injury to persons or damage to property by reducing the seismic wave by way of a smaller charge mass and blasting design and, of course, by evacuating people from their dwellings during actual blasting.

[30] Steps taken to evacuate persons from the 500m blast radius to prevent injuries to people *during* blasting activity, in my view, also reduces the risk to a level below which it is a significant risk. The Appellant has thus satisfactorily shown the Inspectorate that any damage to structures from air blast or ground

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movement that would cause their immediate collapse and thus injure occupants is not a significant risk.

[31] The problem the Appellant faces is with respect to injuries that may be sustained *after* blasting as a result of damage to dwellings caused by ground movement. While any potential damage to the structures *as property* is addressed by the pre- and post-blast inspections, an inconvenience stipend, and agreement reached pertaining to damage to any structures, damage to structures could have delayed health and safety ramifications for occupants. There is evidence that the walls, windows, ceilings and roofs of the dwellings in question are generally already weak and poorly built with low quality material. In light of this, a question quite reasonably arises in the mind of a regulator about what effect repeated ground movement would have on the structural integrity of these dwellings and how these dangers would be detected and mitigated.

[32] The Appellant's founding affidavit is coy about whom exactly from its side will conduct the pre and post blast inspections "to monitor the structures and any potential damage" after a blast (para 6.18). It appears that the pre-and post-blast inspection of dwellings is to be performed initially by the owner, assisted by a representative of the community forum. The Appellant only becomes involved in investigating written complaints made by the home-owner. The question is how home owners will be in a position to properly detect injury risks, whether likely or not, from damage to dwellings caused by ground movement after a blast.

[33] The Appellant's Standard Operating Procedure to which I was referred makes no reference to the inspection of structures after blasting by any suitably qualified or experienced person capable of differentiating between ordinary and serious damage. I also found nothing in the affidavits to show that this inspection would be undertaken by persons with the required knowledge to discern whether any post-blast damaged warranted immediate evacuation of that structure or not. The Appellant speaks of a pre-and post-blast procedure but it assigns itself no role in the actual inspection for damage immediately after a blast. Its attention and expertise is applied only to written complaints lodged by the home owner. This is a risk assessment blindspot. It is not sufficient that a home owner, assisted by the community forum, undertakes the post-blast inspection. This could be no more than the (engineering) blind leading the blind.

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[34] The Memorandum of Understanding with affected households has the same lacuna. It provides only for a final structural survey of homes to assess damage caused by blasting activities after the entire mining project is completed, (clauses 3.1, 4.2). The clause dealing with damage to homes after a blast, does not appear to envisage any expert forming part of that assessment. It appears to place the burden on the home owner (assisted by community leaders) to identify any damage that may be of a "serious" enough nature to pose a threat to the safety of occupants (Clause 4.4) and thus to trigger a complaint to the Appellant.

[35] Clause 5 of the Memorandum of Understanding with individual home owners is further cause for concern. It requires the home owner to lodge a written complaint at the Appellant's security offices, whereafter the Appellant will investigate the complaint and then assess whether the damages are of a serious nature. (Noting that blasting will take place between 14h00 and 16h00, the re-entry of residents to their dwellings to discover any damage could thus well take place in the early evening.) No time-frames are set for the assessment of a complaint that the preceding blast had caused serious damage to a structure. After the investigation of the complaint, the MOU envisages further consultations with the head of the affected household to provide feedback on the investigation. The hole in this mitigatory method is that it does not provide for an expeditious and informed appraisal of a complaint that a dwelling has been rendered unsafe to occupy after a blast.

[36] In its Heads of Argument, counsel for the Appellant stated that:

> *"The only remaining risk for the occupants of the structures would be damage to the structure that may cause it to collapse when the occupants return. Having regard to the pre- and post-blast inspections, to be performed in the presence of not only the owner, but also a representative of the community forum, the potential risk is properly addressed, and contingencies are in place to deal with damage"*

This submission unfortunately gives the impression that post-blast inspections will enjoy the presence of persons other than the home owner and a member of the community forum, when this is not claimed in the Appellant's founding or

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replying affidavit, nor is such a presence provided for in the Appellant's SOPs or MOU's with householders.

[37] The upshot of the SOP and MOU is that Appellant's post-blast procedures seem content that occupants remain in a dwelling that may well contain a serious structural defect cumulatively caused by blasting vibrations; a danger which the occupants and community forum members either do not notice at all for lack of expertise or must wait to have assessed by the Appellant after a written complaint.

[38] In its answering affidavit, the Respondent specifically raises this issue. Mr. Msiza, the Chief Inspector of Mines, avers:

> *"It should be noted that the collapse of a weak structure due to increased cracks caused, by for instance blasting does not always necessarily occur during the blasting. The effect of the cracks is to weaken a structure. A weak structure might collapse anytime, even at night … The risk is foreseeable" (para 10.4).*

[39] The Appellants gloss over this risk in reply. Mr Pierre Louw blithely states that "proper" pre and post blasting inspections will take place. But they are not proper evaluations of risk if the inspections of damage are not informed inspections. The Appellant cryptically and parenthetically states that

> *"(Again, may might, a selected team with visit the house before the blast to evacuate and assess the structures before blasting …)" (para 53).*

To the extent that reference in the replying affidavit to a "selected team" suggests an expert assessment of a structure, such an assessment is described as happening immediately before, not after, a blast and thus does not assess the risk of post-blast collapse.

[40] The Appellant's attitude to post-blast collapse of structures is that their expert reports have discounted such an eventuality. This prospect is thus far-fetched and, legally-speaking, does not constitute a significant risk. This argument is founded essentially by cross-referencing two documents. The first report is prepared by blast management consultants and includes a detailed survey of the dwellings in question. Table 2 thereof sets "recommended ground vibration and air blast" parameters for various structures (Bundle, page 185). The report notes

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that the maximum recommended ground vibration parameters it cites are not set in any legislation. The author states that he derives his data on ground vibration limits from an unfortunately unsourced United States Bureau of Mines guideline on safe blasting. This guideline apparently informs the author's recommendation of a PPV range from a low of 6mm/s for the mud structures to 12.5 for the brick and cement structures. The second report is a desktop study (in fact a calculation) predicting the ground vibration caused at various distances by a blast with a certain charge mass. This report reveals that a blast will generate a PPV of 8.6 mm/s at a distance of 200m, 6.0 mm/s at a distance of 250m, 4.4 mm/s at a distance of 300m, levelling out to a PPV of 3.4 mm/s at a distance of 350m. (Bundle, page 445). Once the type of structure and its distance from the blast is known, acceptable ground vibration limits for this structure may be known.

[41] The first problem is that the reports, especially the first one, does not specify what level of damage to buildings is deemed acceptable at the recommended PPV levels for the blast to still be considered a safe blast. This question arises because the USBM Guideline informing the reports relates to "safe blasting". It is unlikely that the risk of damage to structures must be zero before a blast is considered safe. Are blasts that cause hairline cracks in walls over time regarded as safe? Are blasts that eventually cause joint cracks still acceptable? The Appellant's experts need to have disclosed this information in circumstances where the dwellings in question are likely inferior in quality to the baseline residential structure upon which U.S. safe blasting standards were set.

[42] The two expert reports, read in conjunction, do not provide comfort regarding post-blast collapse on another front too. While the court has accepted the evidence as being expert in nature, a worrying contradiction in the data of the two reports is present. The first report recommends a maximum PPV limit for the dilapidated and poorly constructed structures surveyed on site. For brick and cement dwellings, which are described as "houses of lesser proper construction", the first report recommends a maximum PPV level of 12.5 mm/s (Bundle page 184). However, the second report, which was prepared without any reference to the actual condition of the dwellings, states that the "vibration limit for residential areas are 12.7mm/s, this is based on work done by the USBM" (Bundle, page 445). It is difficult to imagine that reference to "residential areas" in the second

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report denotes structures that are in the condition of the dwellings in the photographs; in other words “houses of lesser proper construction”. If the second report is to be believed, it would reasonably appear to a regulator that the author of the first report derived the PPV limit he recommended from ground movement forces “residential areas” in the United States can withstand. In so doing, the author of the first report provided a discount of a mere 0.2mm/s for the dilapidated state and poor construction quality of the South African dwellings, whose maximum PPV limit is 12.5mm/s. It does not take an expert to be wary of this discrepancy and to expect the Appellant to have more fully explained, transparently sourced and, between its own experts, consistently stated the PPV parameters it recommended.

[43] It is now time to turn to the concept of significant risk and consider how the Inspectorate understood and applied it. In my view, the Inspectorate correctly evaluated risk on two axes. The first is the *chance* or *likelihood* a risk will be realised. The second is the *consequences* if the risk realises. Thus, a high chance that an event will occur, coupled with a negligible consequence may well be assessed to constitute no significant risk overall. Conversely an extremely unlikely event that could set off a nuclear bomb would be considered a significant risk factor needing mitigation. The Appellant in its argument proposed that the court confine the test for significant risk solely to its chance or likelihood of realisation. This is too narrow a test.

[44] What are the risks then? On chance, I do not read the expert reports, and the rest of the evidence placed before the court as excluding damage to dwellings caused by ground vibrations. The Appellant’s own assessment is that structural damage caused by ground vibration is unlikely (Bundle, page 154). I accept the Respondent’s argument that, based on the Appellant’s own risk assessment (not an expert report), the mitigating factors it will adopt only bring the overall risk level (chance and consequence measured together) down from a score of 25 (high risk) to 19 (significant risk). On the Appellant’s own risk assessment, while structural damage is considered unlikely, this is counterbalanced by severe consequences upon realisation of this risk. The listed legal consequences of a score of 19 clearly anticipates personal injury. The Appellant thus errs in interpreting the standard of “significant risk” in Regulation 4.16(2) along the axis

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of chance or likelihood alone. The severity of consequential injury to persons is a co-equal factor in evaluating risk, as its own risk management matrix correctly shows.

[45] Applied to the facts, there is one area of significant risk that endures. This is the risk inherent in - and confined to - the absence of suitable measures to knowledgably and expeditiously assess post-blast damage to structures that may cause building collapse after a blast. Additionally, the Appellant, in its agreements with occupants and its own SOPs, has not committed itself to temporarily accommodate persons during the period of uncertainty after an occupant alleges serious damage but before the Appellant is able to investigate and assess this risk.

[46] I must add that I do not fault the Appellant's mitigation measures in their entirety. Contrary to the Inspectorate's view, the risk of injury to persons *during* a blast is not significant. This risk of damage to property considered on its own is also not significant. This is because the Appellant has in its plan sufficiently mitigated the adverse consequences of property damage by providing for repair and compensation. However the risk to occupants *after* a blast remains significant when the risk of structural collapse is properly understood to take account of both chance and consequence. Consequently, the Inspectorate's risk concern about post-blast collapse of structures was properly weighted as significant and the decision to decline permission to blast within 500m of the dwellings concerned for that reason was correctly made.

[47] In the result the appeal is dismissed, with costs.

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Benita Whitcher

Judge of the Labour Court of South Africa

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APPEARANCES:

APPELLANT:	Adv GJ Scheepers SC, instructed by Van der Merwe Van den Berg Attorneys (leon@vmblaw.co.za)
1st, 2nd and 3rd RESPONDENTS:	Adv VMG Ndiweni, instructed by State Attorney, Johannesburg (Ms Maponya)

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