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Department of the Environment

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The Permanent Secretary
Department of the Environment

Dear Sir,

I am a Principal Scientific Officer, (unified grade 7) and Head of the Failures in Construction Section at BRS and I am writing to appeal against the decision of my Director to put constraints upon my work.

Over the last two decades I have been developing a Hierarchical Mechanics of Failure with specific application to heterogeneous materials such as concrete. The theory adopts an unorthodox view of the nature of strength, and experimental discoveries arising directly out of this theory have shown the conventional understanding of concrete failure mechanisms to be seriously inadequate. The experimental work has already generated significant practical spin-off in the high alumina beams investigation, tests for the integrity of weak construction planes in concrete dams and the measurement of deterioration caused by alkali-silica reaction.

Last Easter the BBC screened a Horizon programme entitled: AFTER CHERNOBYL - CLOSER TO HOME. Its subject was the Hartlepool nuclear power station, the first of the so-called relaxed sites and one of the latest to go operational. Hartlepool is an AGR, an advance gas-cooled reactor. Its boilers are encased inside a massive concrete pressure vessel. During the course of the programme it became apparent that the prestressed concrete pressure vessel was not behaving as expected. In the words of John Large, an engineering consultant called to Hartlepool by the local MP, "Not only is shortfall in the tendons large but it is also not very uniform. For example, you would have some tendons on the Hartlepool reactor which are 22% shortfall, that's 22% under the design one, others at 7%, others at 12%....."

I realized that a large prestressed pressure vessel was just the type of structure in which an inadequate understanding of the failure mechanisms of concrete might become all too apparent. I therefore resumed work on the theoretical development of hierarchical mechanics so that BRS would be in a position to give convincing alternative advice should the Hartlepool problems become more serious.

In the course of this development I wrote an informal internal note for circulation amongst my colleagues to gain their comments on one aspect of hierarchical structuring, a note to which my Director took grave exception. Completely out of the blue I received a formal letter (Enclosure 1) from my director removing my authority, as a Section Head, to produce internal notes and forbidding me to pursue my "novel and eccentric" ideas. I understand the letter was sent against the advice of my Division head (grade 6) and my Group Head (grade 5). My Director did not ask to see me before sending the letter nor has he seen me after sending the letter nor provided any other explanation for his action.

In view of the seriousness of the subject matter of my research I felt I had a moral responsibility to ask him to reconsider his decision and if this failed, appeal against it, and I sent him a memorandum (Encl.2) to this effect.

Having heard nothing a week later I appealed to my Group Head for information (Item 3, enclosed). He very kindly saw me, said the Director had not spoken to him since the letter was sent and suggested that any appeal was bound to go to you.

A few days later I received a response to my memo from the Director (Encl.4) which I found confused. I have therefore decided to send the appeal to you and I am confident you will ensure it is dealt with properly.

In conclusion I would like to say that I have only had grave misgivings about a constructional system 3 times in my long years of government service.

The first time was in my early days at Roads (now TRRL) when my research revealed a very serious defect in the construction of the Ross Spur Motorway. When the Resident Engineer and the Contractor were eventually persuaded of the reality of this defect, the specification for the unconstructed section was completely changed, and the already finished section was very significantly strengthened by doubling up the top layer of construction. The cost of the remedial action was of course considerable but had the defect not been detected during construction, the cost would have been far greater.

The second time was 13 years ago when Pilkingtons introduced GRC (glass reinforced cement), as a new sheet composite for cladding panels. Research results and my engineering experience convinced me that the material would start to fail within about five years of manufacture. I clearly indicated the likely problems and strenuously opposed its introduction at all decision levels, even managing to involve the then Director General in the argument. Unfortunately, short-term commercial considerations proved dominant and exploitation of the material went ahead. Within 5 years major failures were starting to occur. The plethora of legal claims against manufacturers became so serious that all the main firms abandoned panel manufacture and even Pilkingtons allowed GRC Ltd., its wholly owned subsidiary, to go into liquidation.

The third time was last Easter when I became aware of the problems at Hartlepool. I sincerely hope that my misgivings will prove to be unfounded but it seems simple prudence that they be thoroughly investigated and not be aborted or hindered by the decision of a single individual whose fiat has stigmatized my work "novel", "eccentric" and a "hazard to the professional reputation of this Establishment".

Thank you for your attention in this matter.

Yours sincerely,

(Frank Grimer)