BREVET DE TECHNICIEN SUPERIEUR

Groupement 15

session 2002

ANGLAIS

Durée : 2 h

- SUJET -

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Spécialités de BTS du groupement 15 :

Agencement de l'environnement architectural
Aménagement - finition
Bâtiment
Charpente - couverture
Constructions métalliques
Enveloppe du bâtiment
Études et économie de la construction
Géomètre topographe
Systèmes constructifs bois et habitat
Travaux publics

LVEG ANGL

HOW THE WORLD TRADE CENTER FELL

The design of the World Trade Center saved thousands of lives by standing for well over an hour after the planes crashed into its twin towers, say structural engineers. But the towers' ultimate collapse was inevitable, as the steel cores inside them reached temperatures of 800°C. – raising questions as to why hundreds of rescue workers were sent into the doomed buildings to their deaths. The steel and concrete structures performed amazingly well, said John Knapton, professor in structural engineering at Newcastle University, UK.

But as fires raged in the towers, driven by aviation fuel, the steel cores in each building would have eventually reached 800°C. – hot enough to start buckling and collapsing.

"It was the fire that killed the buildings. there's nothing on earth that could survive those temperatures with that amount of fuel burning," said structural engineer Chris Wise. "The columns would have melted, the floors would have melted and eventually they would have collapsed one on top of each other."

The buildings' construction manager, Hyman Brown, agreed that nothing could have saved them from the inferno.

"Steel melts, and 24,000 gallons (91,000 litres) of aviation fluid melted the steel. Once the steel frame on one floor had melted, it collapsed downwards, inflicting massive forces on the already-weakened floor below.

From then on, the collapse became inevitable, as each new falling floor added to the downward forces. Further down the building, even steel at normal temperatures gave way under the enormous weight – an estimated 100,000 tonnes from the upper floors alone. The eventual collapse of the twin towers was so predictable that the order should have been given to withdraw emergency services within an hour, said Professor Knapton.

The building's design was standard in the 1960s when construction began. At the heart of the structure was a steel and concrete core, housing lift shafts and stairwells. Steel beams radiate outwards and connect with steel uprights, forming the building's outer wall. All the steel was covered in concrete to guarantee firefighters a minimum period of one or two hours in which they could operate – although aviation fuel would have driven the fire to higher-than-normal temperatures. The floors were also concrete. Newer skyscrapers are constructed using cheaper methods. This building was magnificent, say experts, in the face of utterly unpredictable disaster.

By Sheila Barter. BBC News Online. 13 September 2001.

TRAVAIL DEMANDÉ

I - COMPRÉHENSION DU TEXTE : *(10 pts)*

Faire, en français, un compte rendu du document (200 mots, ± 10%).

II - EXPRESSION ÉCRITE EN LANGUE ANGLAISE : *(10 pts)*

Répondre aux deux questions suivantes :

1/ What could be done about structure, shape, height, security, evacuation, etc... to improve safety in the construction of high-rise buildings ? *100 mots* *(5 pts)*

2/ As a technician, would you rather take part in a long lasting large scale project or move from a small site to another ? Give your reasons. *100 mots* *(5 pts)*

MEC ANG