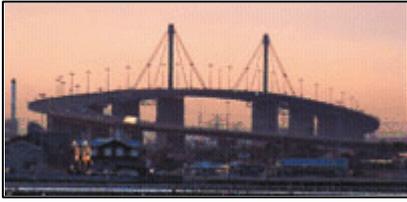


The West Gate Bridge and Pat Preston



The West Gate Bridge is one of Melbourne's most instantly recognised landmarks.

Used by more than 140,000 vehicles per day and high enough for shipping to enter the Port of Melbourne, it spans the Yarra River, close to where its mouth empties into Port Phillip Bay.

The West Gate Bridge is over 2.5 kilometres in length, with a main river span of 336 metres. It has four traffic lanes plus a breakdown lane in each direction. It has a navigational clearance to low water of 53.7 metres and its two towers stand 102 metres high.

Built at a cost of \$202 million, construction work commenced on 22 April 1968 and was eventually completed on 15 November 1978.

But a terrible event occurred during its construction; one that has permanently linked the name West Gate Bridge to Australia's single worst ever workplace catastrophe.

At 11.50 am on 15 October 1970, the bridge's 112 metre span 10-11 collapsed during construction, killing 35 workers, injuring many more and changing countless lives forever.

One of the survivors was Pat Preston, who was a couple of metres from the hoist cage (shown in the right foreground of the photo below) when the collapse occurred.



Pat is well known throughout Victoria's construction industry as the Manager of the CFMEU's OHS & Environmental Unit, and he is widely respected for his passion, untiring work and achievements in the cause of construction safety.

But back in 1970, he was a 29-year-old crane operator and Federated Engine Drivers' & Firemans' Association (FEDFA) shop steward, one of many workers on what was then Melbourne's largest and most prestigious construction project.

PAT'S ROAD TO WEST GATE

Patrick George Preston started life in grim and dangerous times. He was born during an air raid on London's Paddington in December 1940, when night after night the Third Reich's *Luftwaffe* was pounding the British capital's East End.

He left school at 15 to serve in Britain's Royal Navy for the next 10 years. Then, like many of his fellow Britons at the time, Pat migrated to Australia in 1966.

He quickly found work on Melbourne's building sites, moving from job to job as the work ebbed and flowed. Those were the days when building workers were hired on the spot and fired with an hour's notice or an hour's pay in lieu of notice. Pat remembers one year when he submitted 13 Group Certificates, each from a different builder, with his taxation return.

In 1968, Pat got a start with John Holland Constructions on the best and biggest project in Melbourne, the construction of the West Gate Bridge.

He started on the western side of the river as a rigger, later becoming a crane operator on the non-slewing mobile cranes known as "tractor cranes" that were used for pick-and-carry work around the site. Before too long, he was elected as a Shop Steward to represent his fellow crane operators on that part of the project.

Like most young workers, he intrinsically believed that he was immortal, with workplace injuries and deaths being things that happened to other people, not him or his mates.

TIMETABLE TO DISASTER

Some of the key decisions that eventually led to the events of 15 October 1970 included the following:

1965: The Victorian Government establishes the Lower Yarra Crossing Authority (LYCA) as a non-profit company to construct and operate the crossing.

1967: LYCA appoints two firms, Maunsell and Partners, and the UK firm Freeman Fox Partners, as joint consultants for detailed design up to the preparation of tender documents.

1968: John Holland Construction is awarded contracts for foundations work and concrete construction, and the contract for steelwork construction is awarded to World Services and Construction. The bridge's steel spans will consist of pairs of steel box girders fabricated in two workshops at the bridge site, with each steel box having 21 stiffened plate panels.

1970: With erection of steelwork well behind schedule, LYCA makes new contractual arrangements in March, under which World Services continues to fabricate the steel box girder spans and John Holland takes over their erection and joining. John Holland, which has no previous experience in box girder construction, transfers responsibility for engineering decisions on erection stresses to Freeman Fox via a labour management contract.

REMEMBERING THE EARLY YEARS

Pat recalls the early years on the project as a period when the modern concept of occupational health and safety management was unknown.

Many of the hazards and risks that are now universally recognised were not understood, or were simply ignored.

Asbestos was the material of choice for welding blankets and welders' gloves, and several West Gate construction workers have since died of mesothelioma. Riggers walked the bare steel with nothing to stop them falling except for good balance and good luck, and dogmen rode the crane hook as a matter of course. Boilermakers welding galvanised steel were "protected" by being encouraged to drink a pint of milk a day. Residual current devices for electrical wiring and equipment had not been invented, and hearing loss from excessive and prolonged noise levels was taken for granted as "one of those things".

But there *were* things the workers knew were not right. For example, they were concerned about the health effects of the special paints laced with lead and chromium that were used to protect the steel from corrosion. And there was a litany of injuries and dangerous occurrences that seemed to happen on an all-too-frequent basis. Getting their concerns taken seriously and dealt with promptly was a continual struggle.

"At that time, safety issues were safety disputes," Pat recalled. "There was no site safety committee and the company had no formal process for dealing with the workers' health and safety concerns. So the unions had no alternative but to take industrial action over particular issues until management took notice of them."

A WARNING OF WHAT WAS TO COME

Four months before the collapse of the West Gate Bridge, on the other side of the world, another box girder bridge designed by Freeman Fox collapsed during construction in Milford Haven, Wales, killing four workers.

When news of this tragedy filtered through, many of the West Gate workers grew increasingly concerned, particularly when they learnt of the similarities in the design of the two bridges.

Pat vividly recalls a mass stop-work meeting where the construction workforce demanded assurances from the project management that what had happened in Milford Haven could not happen to the West Gate. And a senior engineer from Freeman Fox stood up before the workers and unhesitatingly gave them that assurance. And so, work resumed.

THE COLLAPSE

At the time John Holland took over the steel erection, span 10-11 was partially assembled on the ground. When the two halves of the span were brought together in the air, their difference in levels was up to 114 mm.

A number of 8-tonne concrete blocks were lifted and placed in the mid span to remove the camber, but with seven blocks in place, a buckle developed in the upper panel of the north span. Bolts connecting the traverse splice in the top deck near the mid span were then undone to allow the buckle to be rectified.

On the morning of 15 October 1970, after about 30 bolts were removed, the buckle dramatically spread into the two adjacent outer panels and buckling failure occurred to the upper part of the inner web plate.

As men worked frantically to stem the chain reaction, further slow yielding took place over the next 50 minutes until the final collapse.

The death toll from the collapse included ten riggers, ten boilermakers, six ironworkers, four engineers, three carpenters, one fitter and one first-aider.

PAT'S MEMORIES OF THE COLLAPSE AND THE DAYS FOLLOWING

It was getting close to the mid-day lunch break when Pat parked his crane a few metres from the personnel and materials hoist, waiting for a couple of his mates from the rigging crew to come down.

"I'm a bit embarrassed to admit it," Pat confesses, "but I was going to give them a lift up to the nearby Spotiswoode Hotel for a couple of lunchtime beers." This was during an era, now thankfully long past on most construction sites, where the consumption of alcohol during the working day was widespread amongst workers and was usually tolerated by management. But Pat and his mates never made it to the pub that lunchtime.

At 11.50 am, with a terrible sound of rending steel, all hell broke loose as the span collapsed.

Pat instinctively leapt from his seat and took shelter behind one of the crane's rear wheels as debris rained around him.

He watched disbelievingly as a carpenter, Ross Bigmore, fell to his death into the Stony Creek backwash. One of the engineers who died that day, Ian Miller, fell to the ground only metres in front of him. He remembers the legs of another carpenter, Amedeo Boscolo, protruding from beneath an 8-tonne concrete block.

A little later, Pat recalls helping to carry out another engineer, Jack Hindshaw, on a door, pressed into service as an improvised stretcher, from the twisted wreckage.

The rest of the day was a blur of frantic searching, the collection of bodies and ferrying injured workers to the fleet of attending ambulances.

In the following days, Pat attended so many funerals that he has lost count. Time after time, he witnessed the grief, shock, sorrow and anger of widows, parents, brothers, sisters, children and friends of his dead workmates.

And when he was not attending funerals, he was visiting injured comrades scattered around Melbourne's hospitals. Some of these men never returned to construction work, such was the extent of their injuries.

Many workers suffered severe psychological damage, not much different to the "shell shock" that ruined the lives of so many soldiers on the Western Front during the First World War. In 1970, organised grief counselling for the survivors of construction incidents was unheard of.

Following the clean-up, work on the bridge ceased while the investigations commenced. It did not resume until 1972, this time under a joint venture; Holland Doorman Long.

THE ENGINEERING AND PROJECT MANAGEMENT LESSONS OF WEST GATE

In the wake of the collapse, the Victorian Government set up a Royal Commission with wide-ranging terms of reference.

The *Report of the Royal Commission into the Failure of the West Gate Bridge* was published in 1971.

Twenty years after the collapse, two engineers from Ballarat University's Division of Engineering & Science, Brian Coles and Trevor Gourley, wrote a Case Study for engineering students on the incident, based on the evidence presented to the Royal Commission.

It was one of a series of case studies on a variety of issues compiled by Australia's National Occupational Health & Safety Commission, and first published as *Occupational Health and Safety for Engineers* in 1990.

Coles and Gourley characterised the West Gate Bridge collapse as "this blot on Australia's engineering history".

It was, they wrote, the culmination of a series of failures in design, construction and management.

They concluded that the design-related failures associated with this disaster may be avoided on future projects by approaching the design of major structures as follows:

- *Factors of safety in design should be appropriate to the state of knowledge pertaining to the type of structure being designed. For complex and highly advanced structures such as West Gate Bridge, in which certain analysis and design issues remain unresolved, higher than usual factors are required.*
- *The design process must be approached in a responsible, thorough and organised manner. Adequate time must be allowed. Whilst design may be guided by intuition and experience, documented rules and procedures should not be ignored or distorted without a complete understanding of their background. Simple principles of structural behaviour must be taken account of.*
- *Critical design assumptions concerning construction tolerances must be translated into specification requirements, which must then be enforced during construction.*
- *A detailed independent check of the structural design should be undertaken, leaving the question of structural adequacy in no doubt.*
- *The safety of the structure during erection must be guaranteed by the designers of the structure. This may be achieved by the designer performing all necessary computations for the erection and conditions proposed by the contractor, or checking thoroughly computations produced by the contractor.*

Coles and Gourley also drew attention to the "numerous problems caused by both technical and managerial failures" that were encountered during the bridge's construction.

They concluded that these problems pointed to the need for attention to the following aspects in the construction of major structures:

- *Non-standard construction operations, likely to induce significant stresses or deformations in a structure, should not be attempted without formal approval being obtained from authorised personnel who are in a position to properly assess the proposal.*
- *The contractual relationship and the division of responsibilities between the contractor and resident engineer must be clearly defined. Developing disharmony must be resolved at an early stage, if the project is to proceed as efficiently as possible.*
- *Engineering staff on site must be headed by experienced, senior personnel who maintain close liaison with their staff and are fully briefed on progress and problems, both technical and contractual.*
- *The area of industrial relations, if poorly managed, is a potential source of major disruption. The engagement of personnel highly experienced in this area is thus most important.*
- *The workability of complex construction procedures must be rigorously assessed before adoption. Procedure manuals should be comprehensive, yet clear and understandable. Site staff must be intimately familiar with such documented procedures and understand the importance of close adherence to them. This applies as much to the resident engineer's staff as it does to the contractor's staff.*
- *The line of communication between site engineering staff and their head office must be clearly established and responsive. Queries should be dealt with rapidly and clearly.*

HOW PAT'S WORLD CHANGED

The collapse of the West Gate Bridge instantly changed three things for Pat Preston.

His assumption that "it'll never happen to me" was gone forever.

And so was his unquestioning faith in the wisdom and invincibility of engineers.

But he also gained something on that day that set him on the course he still pursues. He gained a passion and a lifelong commitment to the cause of construction safety.

He went back on to the bridge when work resumed in 1972, but now things had changed.

Now there was a site safety committee and the Project Manager was on it in person. In fact, many of the things that didn't make it into law until the Victorian ***Occupational Health and Safety Act*** was passed in 1985, were put into practice on the West Gate Bridge project.

After the bridge was completed in 1978, Pat was taken on by the FEDFA as an Industrial Officer, and he later became the Union's Victorian Assistant Secretary.

Towards the end of 1988, he moved over to what is now the CFMEU's Construction & General Division as an OHS Officer. He has, for many years now, been the Manager of that Union's OHS & Environmental Unit.

THE LEGACY OF WESTGATE FOR PAT

Many of the OHS initiatives now entrenched in the Victorian commercial construction industry bear the unmistakable fingerprints of Pat Preston.

And you don't have to scratch the surface too far to make the connections back to his direct experiences on the West Gate Bridge. For example:

- Incolink-provided grief counselling for construction workers is now standard,
- An industry-wide OHS induction agreement is now in place,
- An Industry Standard on precast and tilt-up construction, the development of which was driven by Pat, codifies the key engineering and managerial lessons of West Gate.

These are just a few of the things Pat has fought for and achieved; things that can save lives, prevent injuries and bolster the welfare of construction workers.

And there are other things about the way Pat operates that reveal the indelible mark of West Gate. There would hardly have been a commercial construction fatality anywhere in Victoria that has not instantly brought Pat to the site. He is there for the survivors, he is there for the next-of-kin, and he is there to respect the dead.

Every month, Pat chairs a meeting of over a hundred workers' Health & Safety Representatives. These men are not shrinking violets and when they have a concern, they demand and expect action. And Pat is their spokesman, their champion and their leader in taking up their issues with the builders, with the sub-contractors, with WorkSafe, or whoever else he thinks needs to listen.

This is a far cry from his early days on the West Gate project when there were no Health & Safety Representatives, no safety network across sites, and no established processes or forums for raising the big issues and getting agreement on actions.

On 23 April 2003, when the Australian Commonwealth Government announced the names of those Australians honoured with its Centenary Medal, it was only fitting that one of those names was Patrick George Preston.

His medal citation reads:

“For service to health and safety in the workplace”.

It would be safe to bet that on the morning of 15 October 1970, as he waited for his mates to join him for a beer, if you'd have told him he'd end up with a medal like that, he would have laughed in your face.

But that was before Pat Preston's life was changed forever.

THE MEMORIAL TO THOSE THAT LOST THEIR LIVES

Paid for by the workers who subsequently completed the West Gate Bridge a memorial plaque was unveiled on 15 October 1978 near Douglas Parade, Spotswood.

It contains the names and occupations of the 35 workers who died in the collapse.

Every year, at 11.50 am on 15 October, family and friends of the workers who lost their lives, men who worked on the bridge's construction, and many of today's generation gather to remember, to reflect, to catch up, and to renew their commitment to a safer and healthier construction industry.

Come hail, rain or shine, one person who is always there is Pat Preston.



Memorial plaque on Spotswood side of the West Gate Bridge. It reads as follows:

**CONSTRUCTION WORKERS EMPLOYED ON WESTGATE BRIDGE ERECTED AND DEDICATED THIS
MEMORIAL TO THEIR 35 WORKMATES
WHO WERE KILLED WHEN A SPAN OF THE BRIDGE COLLAPSED DURING CONSTRUCTION
AT 11-50 A.M. 15TH OCTOBER 1970.
OUR COMRADES WHO LOST THEIR LIVES WERE:**

ROVYN BARBUTO	BOILERMAKER	PETER McGUIRE	RIGGER
ROSS BIGMORE	CARPENTER	IAN MILLER	ENGINEER
AMEDEO BOSCOLO	CARPENTER	JEREMIAH MURPHY	RIGGER
BERNARD BUTTERS	BOILERMAKER	DENNIS O'BRIEN	RIGGER
CYRIL CARMICHAEL	IRONWORKER	JOSEPH OZELIS	FIRST-AID
PETER CROSSLEY	ENGINEER	FRANK PIERMARINI	RIGGER
PETER DAWSON	RIGGER	GEORGE PRAM	RIGGER
ABRAHAM EDEN	RIGGER	LESLEY SCARLETT	IRONWORKER
ANTHONY FALZON	CARPENTER	CHRISTOPHER STEWART	BOILERMAKER
ESEQUIEL FERNANDEZ	IRONWORKER	ALFONSO SUAREZ	BOILERMAKER
BERNARD FITZSIMMONDS	IRONWORKER	WILLIAM TRACY	ENGINEER
VICTOR GERADA	IRONWORKER	GEORGE TISHILDIS	BOILERMAKER
JOHN GRIST	BOILERMAKER	EDGAR UPSDELL	IRONWORKER
WILLIAM HARBURN	BOILERMAKER	ROBERT WEST	BOILERMAKER
JACK HINDSHAW	ENGINEER	ROBERT WHELAN	BOILERMAKER
TREVOR HUNSDALE	FITTER	PATRICK WOODS	RIGGER
JOHN LITTLE	RIGGER	BARRY WRIGHT	BOILERMAKER
CHARLES LUND	RIGGER		

**IN MEMORY OF WORKERS OF ALL LANDS
WHO ARE KILLED IN INDUSTRIAL ACCIDENTS**

This article was prepared and published by WorkSafe Victoria's Construction Safety Circulation Service to mark the 33rd anniversary of the collapse of the West Gate Bridge.
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