

The July 2009 flyrock incidents at the **Pakenham Quarry** (near Arnprior/Pakenham, Lanark County, Ontario) are among the better-documented quarry flyrock cases in Canada because they ultimately resulted in regulatory investigations, engineering reviews, and environmental prosecutions.

Summary

There were **two separate flyrock incidents**:

Date	What happened	Maximum known distance
20 July 2009	Flyrock left the quarry and struck a worker at a neighbouring business on the arm.	Beyond the original 200 m blast exclusion zone
23 July 2009	Flyrock struck a quarry scale house, damaged two civilian vehicles waiting on Young Road, and travelled well outside the control zone.	About 300 m

The investigation concluded that the **200 m blast control zone was inadequate**, recommending it be increased to **500 metres** for future blasts.

Location

The incident occurred at the **Pakenham Quarry**, a licensed limestone quarry near **Arnprior/Pakenham, Ontario**.

The blasting contractor was:

- **Austin Powder Ltd.**

The quarry owner/operator was:

- **Thomas Cavanagh Construction Ltd.**

These names appear throughout the Ministry of Environment investigation and subsequent prosecutions.

First incident — 20 July 2009

The first blast launched rock beyond the 200 m blast area.

Known facts:

- flyrock travelled outside quarry property
- a worker at a neighbouring business was struck on the arm
- injury was relatively minor
- however, it demonstrated that flyrock was escaping the established exclusion zone

A later engineering review concluded that video of the blast clearly showed flyrock originating from the toe of the blast.

Explotech Engineering later wrote:

"A review of the video of the July 20, 2009 blast clearly shows flyrock rifling from the toe area..."

They further concluded Austin Powder personnel either **knew or should have known** that flyrock had travelled beyond the quarry boundary.

Second incident — 23 July 2009

Three days later another blast produced substantially more flyrock.

Official findings state:

- rocks flew well beyond the designated control area
- quarry scale house (230 m away) was struck
- two civilian vehicles stopped on Young Road (~300 m away) were struck
- vehicles suffered extensive damage
- occupants were not injured

The Ministry's summary states:

Rocks were observed flying well beyond the control area.

The incident impaired public safety despite fortunately causing no injuries.

Engineering investigation

The Ontario Ministry of Environment retained:

Explotech Engineering Ltd.

Their investigation concluded:

Although blast procedures appeared generally consistent with practice, there remained a possibility of recurrence.

The key recommendation:

"We strongly recommend that the hazard zone be increased to 500 m when firing any future blasts."

Date of report:

25 September 2009

Why 500 metres?

The original exclusion (hazard) zone was:

200 metres

Actual flyrock reached:

- 230 m (scale house)
- approximately 300 m (vehicles)
- beyond quarry property

Because flyrock had exceeded the designed blast area by roughly **100 metres**, investigators concluded the blast area itself was undersized.

The recommendation was therefore to increase the hazard zone to:

500 metres (1,640 ft)

This recommendation has since been cited repeatedly in quarry setback literature as an example of conservative blast-area design.

Environmental prosecution

The incident became legally significant because Ontario treated the flyrock as a **contaminant released into the environment** under the **Environmental Protection Act**.

Austin Powder pleaded guilty to:

- discharging flyrock into the natural environment
- failing to report the incidents

The reported fine was:

\$130,000

This became one of the earliest Ontario cases establishing that flyrock could constitute an environmental contaminant requiring reporting.

Failure to report

Investigators found the incidents were **not immediately reported** to the Ontario Ministry of Environment.

Company officials reportedly stated they were unaware that flyrock constituted a reportable environmental discharge under the Environmental Protection Act.

Follow-up investigation (2010)

Explotech later reviewed the earlier July 20 blast after additional evidence became available.

Their conclusions became stronger.

Among them:

- Austin personnel should have recognized the flyrock
- damage checks should have been performed

- blasting procedures should have been reviewed before conducting subsequent blasts
- the first incident should have alerted personnel that the safety zone was insufficient

These findings criticized not only the blast outcome but also the response following the first event.

Technical cause

The reports do **not identify a single definitive geological or operational failure**.

Instead they indicate:

- blast procedures appeared generally compliant
- unpredictable geological conditions can contribute to flyrock
- flyrock can occur despite apparently proper practice
- exclusion zones must account for that uncertainty

Some testimony cited during the investigation included statements such as:

- many flyrock events are difficult to explain
- hidden mud seams or voids cannot always be detected
- hazard zones therefore require conservative design

These observations were used to support the larger 500 m exclusion zone.

Why this case is frequently cited

The Pakenham incident is commonly referenced in blasting safety literature because it demonstrates several important lessons:

- a **200 m exclusion zone proved inadequate**
- relatively small flyrock events can escalate into public safety incidents
- repeated incidents occurred within days
- engineering review led to a substantial increase in the recommended hazard zone
- the case influenced discussions of quarry setbacks, blast-area design, and environmental reporting obligations in Ontario.

Overall, the documented record shows two flyrock events on **20 and 23 July 2009** that extended well beyond the planned 200 m control area, causing one minor injury, damage to a

scale house and two public vehicles, and prompting an engineering recommendation to increase the blast hazard zone to **500 m**, followed by environmental enforcement against the blasting contractor for the discharge of flyrock and failure to report the incidents.