



# *the* OUTRIGGER

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## R. BAKER & SON Implements Innovative Plan in Manhattan High Rise

Every project comes with unique challenges, some more than others. One recent R. Baker & Son rigging and dismantling project entailed the removal of massive falsework I-beams from the 6th floor of a Manhattan high rise, which were cantilevered out 25 feet over the roofs of two adjacent buildings. Engineering, rigging and demolition teams collaborated closely to develop an innovative plan to remove the huge beams in a safe and efficient manner.

Due to the many logistical challenges, the Baker team determined that **beam sections would have to be cut and removed from the inside of the building, rather than from the exposed ends.** Specially-designed weighted dollies, key components to the procedure, were fabricated and attached beneath the I-beams to serve as counterweights. Workers then carefully cut out 4-foot, 1,200 lb. sections from the inner part of the building, and the counterweighted dollies prevented the cantilevered ends from tipping past the fulcrum point when the sections were detached. As each section was removed, the dolly-supported beams were pulled four feet into the building, and the process was repeated. Removed sections were stacked three-high, and an in-house material hoist was utilized to remove the 3,600 lb. stacks from the building.

In the upper right photo, two counterweighted dollies support a steel I-beam as it is prepared to be pulled into the building. Below right, an R. Baker & Son crew member attaches a winch to the cantilevered end of an I-beam.



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## AIR POWERED DEMOLITION HAMMERS

**Variations of the modern day pneumatic jackhammer, also known as a pneumatic drill or pneumatic hammer, have been in use since the mid-19th century.** It is difficult to pinpoint exactly who invented the pneumatic jackhammer, but the first recorded use of compressed air to power one was in Pennsylvania in 1851 by James W. Fowle. Subsequent engineers refined the jackhammer to what it is today.

Portable hand-held jackhammers come in several types and weight classes. Heavier 80-90 lb. machines are generally used for concrete or rock in excess of 6 inches, and smaller units are used for smaller jobs and tight areas. Drill bits come in a variety of sizes and shapes - chisels, spades, flat tips, points, stake drivers, moils - and sizes.

**Most pneumatic jackhammers are powered by rotary compressors driven by a diesel engine.** Inside the jackhammer is a circuit of tubes and a piston. Compressed air enters the jackhammer and forces air into a cylinder above the piston, which drives the bit into the working surface. The downward force of the piston causes an internal valve



to change position and reroute compressed air beneath the piston, forcing the piston backward upward and releasing pressure from the ground. This repeating cycle produces up to 1,500 powerful blows per minute.

**For large-scale demolition, construction groundwork, roadwork, and quarrying, rig-mounted hydraulic hammers can be fitted to excavators or backhoes.** Small electromechanical and electropneumatic jackhammers are used for applications where access to a compressor is impractical. These types can't generally match the muscle of compressor-powered machines, but more powerful units are under development.

## How It Works: BIM in Rigging & Demolition

**Building Information Modeling, or BIM, is the process of creating and utilizing a single, coherent 3D digital model representing a building's physical and functional characteristics from design and construction, through the entirety of its life cycle, and ending in demolition.** BIM is becoming more and more widely embraced in the construction industry, and R. Baker & Son has had the opportunity to utilize BIM technology on rigging, dismantling and demolition projects on an increasingly regular basis

Rigging equipment into existing and new buildings and moving it within limited confines can present numerous challenges. On new construction projects, BIM models can be used early on to coordinate scheduling and plot delivery paths to the smallest detail. Rigging teams can use BIM in existing facilities to visualize and create complex rigging routes through small openings and around tight corners. During one recent project, R. Baker & Son was able to utilize BIM modeling to successfully rig two large chillers through a small skylight with a mere four inches of clearance.

**BIM technology is also used on demolition and dismantling projects to determine a building features, spot problems, and plan logistical details.** As its popularity rises, invaluable BIM information will be available to aid contractors like R. Baker & Son with project planning and execution with ever-growing frequency.

## RSIs: REPETITIVE STRAIN INJURY

Repetitive strain injuries are activity-related injuries to the musculoskeletal system, and **they are more common in construction than in any other industry**. Also known as cumulative trauma disorders, repetitive motion disorders, and overuse syndrome, RSIs are the leading cause of occupational disease in the United States and cost billions of dollars each year in workers' compensation.

Work-related RSIs result when the body is subjected to stresses caused by repetitive tasks, forceful exertions, vibrations, mechanical compression, or sustained awkward positions. Some common RSIs are carpal tunnel syndrome, thoracic outlet syndrome, Raynaud's syndrome, and trigger finger. Jackhammer operators can suffer hand-arm vibration syndrome, painters frequently suffer from tennis elbow, and plumbers often develop rotator cuff tendonitis from working with their arms above shoulder level.

### Preventing RSIs

To prevent RSI, identify hazards in the workplace and take steps to correct them. **Be aware of early symptoms such as pain or tingling in neck, shoulders, arms or hands.** Break up prolonged repetitive movement with rest periods, or by rotating tasks. Stretch or move around if you experience any task-related discomfort. Use ergonomic tools specifically designed for the task at hand. Arrange layout of tools and equipment to minimize excessive stretching and bending, and practice proper lifting techniques. Because cold can increase RSIs, especially those related to vibration, wear gloves or use hand warmers when possible. Use ergonomic PPEs such as back supports, wrist and arm supports, and elbow and knee pads, vibration dampening gear, and boots with good ankle support.



## Smoke Eaters 101: Welding Fume Extractors

A fume extractor, sometimes called a smoke eater, is an important piece of equipment in the demolition industry. Welding and cutting fumes can pose significant health risks when left unchecked, so **it is necessary to extract and**



**filter harmful fumes at their source, particularly when cutting or welding indoors,** in ceilings, in crawl spaces, behind machines and other confined areas. Portable fume extraction machines come in different sizes and levels of filtration depending on specific need. Many units are equipped with multiple filters: one or more pre-filters to remove larger particles and foreign matter, a primary filter to remove particles as small as 0.3 microns, and a carbon filter to eliminate odor.

As with any equipment, fume extractors should be properly maintained to keep them working at their optimum safety and efficiency.