



7000 SERIES

BUILDING MAINTENANCE UNITS

SPECIALIST BUILDING
ACCESS SOLUTIONS

The Sky's the Limit – Introducing the CoxGomyl 7000 series

Gone are the days where all skyscrapers had square footprints and flat roofs. Advances in construction materials, engineering practices and architectural design means that towers of the 21st century now challenge building convention on a daily basis.

The CoxGomyl 7000 range leverages our wealth of experience in designing integrated solutions for the world's tallest and most complex structures. Designed specifically for use on buildings with façades of high to very high complexity, the series boasts capabilities far beyond that of our standardised ranges for low to medium complexity buildings (such as the 5000 or 1000 Series).

Fully customisable for every unique project, the 7000 Series solutions draws on our ever-expanding library of bespoke façade access systems and machine modules. Each machine we produce is guided by CoxGomyl's core design principles:

Imagination and creativity – Every building has a unique set of features and requirements which require creative, cost-effective solutions.

Systems integration – We work with our clients and leading consultants to integrate the BMU system into the structure with minimal disruption to the architectural form of the building, as well as making sure we achieve access to all facade surfaces.

Quality and service – Designed, manufactured and maintained to the most stringent quality standards, our machines are built to last like the buildings they inhabit.





CoxGomyl Approaches and Specialisations



*Above: One Raffles Place, Singapore
This page: Duke Energy Center, USA*

Designers, consultants, constructors or owners are often faced with complicated façade challenges. Whether your building is mega-tall (>600 metres), unusually shaped (such as disc shaped, leaning or spiral plan), or features intricate façades (like protrusions, slopes, recesses or curves), the CoxGomyl designers have a solution. These all make use of CoxGomyl's broad range of expert strategies and methods, such as:

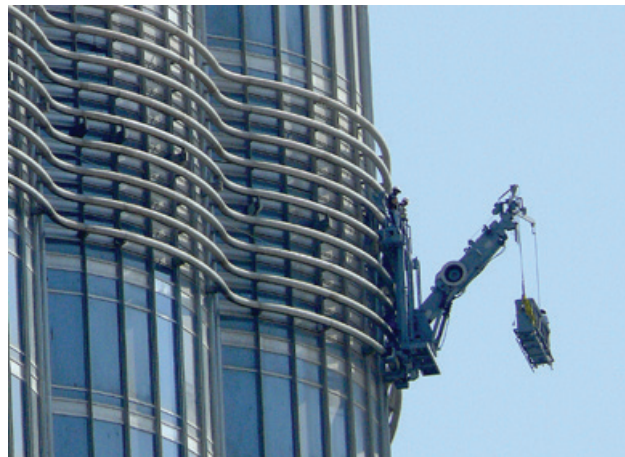
Machine Placement Away From the Edge

Sometimes the BMU has to be located quite some distance from the façade that needs to be accessed. This could be due to a number of reasons, such as building design aesthetic, track placement options or available structural support. In these instances, a long outreach for the BMU is necessary. Typically this is solved by using a multi-stage telescoping jib, which can also compress to a smaller parked footprint. CoxGomyl jib lengths range from a compact 0.5 metres up to a massive 50 metres.





Above & top right: Burj Khalifa, Dubai



*Above: ICC, Hong Kong
Below: Shanghai World Financial Center, Shanghai*

Tackling Mega-Tall Buildings

Because of our extensive experience in working with some of the world's most celebrated buildings, it's not surprising that super- and mega-tall buildings come second nature to CoxGomyl. In fact, we thrive on implementing creative solutions for these structures. For example, the vertical height of a super-tall building might need to be serviced by a single drop BMU with a very large capacity hoist.

When deciding which service method to apply, we consider a variety of factors, such as the design of the roof, cleaning cycle, building footprint, BMU placement options, glass replacement strategies and emergency retrieval plans.

Where the solution requires a large capacity hoist to cover the building from top to bottom, CoxGomyl has worked with several hoists over 500 metres, such as the Shanghai World Financial Center and the International Commerce Centre in Hong Kong. Other mega-talls might be best serviced by a multi-zone approach with combinations of machines, such as deployed on Dubai's Burj Khalifa or the Taipei 101.



Concealing the BMU

After so much has been invested in designing an exceptional building from all conceivable angles, no building owner wants to see a BMU sitting unused on the roofline. The CoxGomyl design engineers can suggest a myriad of solutions to hide the BMU once it is not in service, ensuring that your design aesthetic remains intact.

- **Parking Pits** – The BMU is recessed vertically into the building itself for parking, rendering it invisible. Buildings that use this method include the Reflections project in Singapore, 1 Bligh Street Sydney and the Duke Energy Center in Charlotte, North Carolina.
In some cases the BMU may raise itself up out of the pit for operation (as it does on Reflections), or it may be carried on a separate lifting device, such as a scissor lift (like that of the Duke Energy Center).

- **Parking Garages** – The BMU is driven into a garage for parking with doors that close to conceal the machine. This can be on a roof, or if the building has no roof, into the side of the building itself. Shanghai's World Financial Center utilises garages for the mid-levels, as does The Shard in London, which has eight garages.
- **Integrated into the Building Design** – CoxGomyl engineers upon request can work with the architects to feature the BMU as part of the structure itself. For example, Brisbane's CP1 project, where the apex of the building pivots to become the BMU.
- **Curved Façade Traversing** – Some buildings have little or no roof access, combined with curved façade surfaces. In this instance, the BMU is required to leave the building and traverse horizontally across the curvature, before returning for internal parking. Examples of this method include Dubai's Burj Khalifa and the Pearl River Tower in Guangzhou, China.



1 Bligh St, Sydney – parked in a pit and then erect



Burj Khalifa, Dubai – launching and then out along the rails



Pearl River Tower, Guangzhou – launched



Shanghai World Financial Center – garages

Climbing Difficult Surfaces and Slopes

To minimise the number of BMUs required on a building, CoxGomyl often increases the mobility of the rig. To do this, BMU designers can use tracks as a means of guiding and supporting the BMU, as it travels around the major planes of the building.

Over the last 20 years, CoxGomyl has also developed systems that enable these machines to climb surfaces and uneven pitches with inbuilt self-levelling mechanisms. Depending on the design, these machines may use hoist systems or rack-and-pinion mechanisms to climb various sloping surfaces.

Hoist Systems - These can be used in preference to rack and pinion systems when there are longer distances to travel, curves to negotiate and heavier system masses to deal with. Examples include:

Aldar Headquarters, Abu Dhabi - Climbing the circumference of this disc-shaped building.

Abu Dhabi Investment Authority (ADIA) - Sloping, curved, parapet-mounted track climbing systems.

JP Morgan Building, Sydney - A very large 42-tonne machine with a 26-metre jib climbs a 36-degree glass roof.



Aldar Headquarters, Abu Dhabi



JP Morgan, Sydney

Rack-and-Pinion Systems - Examples include:

Mercury City Tower, Moscow - A system of six machines that climb 45-degree inclines.

Broadway, San Diego.

Parkhouse, London - parked inside the roof line, the system emerges on a lifting table to join the rack and pinion climbing system.



*Above: Mercury City Tower, Moscow
Left: Broadway, San Diego*



Navigating the Jib Through Difficult or Tight Spaces

When it comes to final building roof architecture, CoxGomyl designers often find themselves having to navigate around very crowded spaces.

This might be the result of pre-planned features, such as a visual design extension at the top of the building, like the glass shards at the top of London's 'The Shard', or the steel framing on Singapore's 'Reflections'. It may also be the result of unplanned alterations, such as late changes to roof-mounted heating and ventilation systems.

Utilising smart-logic controllers, CoxGomyl designers are able to program launch sequences so that machines automatically navigate their way out of tight conditions. This programmed approach also reduces cycle times, as well as minimising the risk of collision.



*Top: The Shard, London (Top Machine)
This page: Reflections, Singapore, multi-knuckle jib*



Torre Caja, Madrid



The Peninsula Hotel, Hong Kong

Manoeuvring Machines Through Negative or Reverse Positions

Working around deep building recesses, shelves and massive overhangs presents a unique set of façade maintenance issues. By assessing the building's access requirements, CoxGomyl can meet these challenges with innovative tailored solutions.

For example, The Torre Caja in Madrid features a sizeable arch on top of the main building, which requires accessing from above. CoxGomyl designers used an articulated jib design to launch from the rooftop and make its way underneath the arch.

Two other examples include the very large soffits of the Venetian Casino in Macau, and The Peninsula Hotel in Hong Kong, which CoxGomyl services through the deployment of upside-mounted BMUs, suspended from tracks in the soffits.



*Above: Xinyi, Taiwan- Approaching System
This page: Torre Espacio, Madrid – Soft Rope system*

Manipulating the Cradles

The cradle, also known as the platform, scaffold, cage, or gondola, performs the primary function of enabling maintenance staff to access the building exterior. CoxGomyl has developed cradle solutions that enable other movements—aside from going up and down—to be performed in order to interface with challenging slopes and recesses. For example, our approaching systems enable the cradles to move forwards into the building in case there are recesses or protrusions that need to be navigated around.

Furthermore, we have a range of soft rope solutions that enable the cradle to move laterally across the face of the building. Combining these technologies with the possibility of slewing, telescoping or detachable cradle pods enables the cradles to move in three dimensions, in conjunction with the machine and jib movements. These movements allow access to almost any surface configuration.



One Island East, Hong Kong

Customising the Cradle

CoxGomyl's standard range of cradles are rectangular in plan, with a depth of 0.7 metres and lengths of between 1.5 and 10 metres. Depending on the building protrusions and local laws regulating number of descents per day, CoxGomyl can also design bespoke cradle solutions to fit unique building architecture. Examples include Hong Kong's One Island East (cranked ends cradle) and Cheung Kong Centre (corner cradle), Melbourne's 120 Collins St (with multiple forward approaching pods), and the University of Melbourne's satellite cradle.



No Structure Too Unusual



Top left: Aldar HQ, Abu Dhabi
 Top right:
 Sydney Harbour Bridge
 Bottom right:
 Sydney Opera House

Throughout our long history, we have solved access solutions for all sorts of unique structures. Whether it is a totally exceptional concept like the disc-shaped Aldar HQ in Abu Dhabi, or the classically beautiful sails of the Sydney Opera House, CoxGomyl have provided bespoke access systems to keep them looking their finest.

Reliability and Experience

You don't get to be the global leader in building access solutions without having something special.

With more than 5000 references installed around the world, project managers have chosen CoxGomyl because of our innovation and quality. When the project is special, unique and highly challenging, CoxGomyl have the solution.





We have also provided external access systems for other built structures. For bridges, we have designed under carriageway access gantries, pylon maintenance systems and arch maintenance systems. We have also developed custom systems for unique structures like Ferris wheels, monuments, and in the case of industrial clients, manufacturing infrastructure.

*Top left: Southern Star Ferris Wheel, Melbourne
Top right: Tank inspection system*

Your building is designed to last for decades, and your maintenance equipment should be capable of going the distance. We stand by our equipment through its entire life: we design it, make it and project manage it, install it and maintain it.

With more than 50 continuous years of experience, you can rely on our knowledge and experience to ensure you get the best solutions for your project.

Your CoxGomyl representative would be happy to explain more about each of these projects or provide specific job sheets if desired.

Zifeng
Greenland
Nanjing
450m

World One
Mumbai
442m

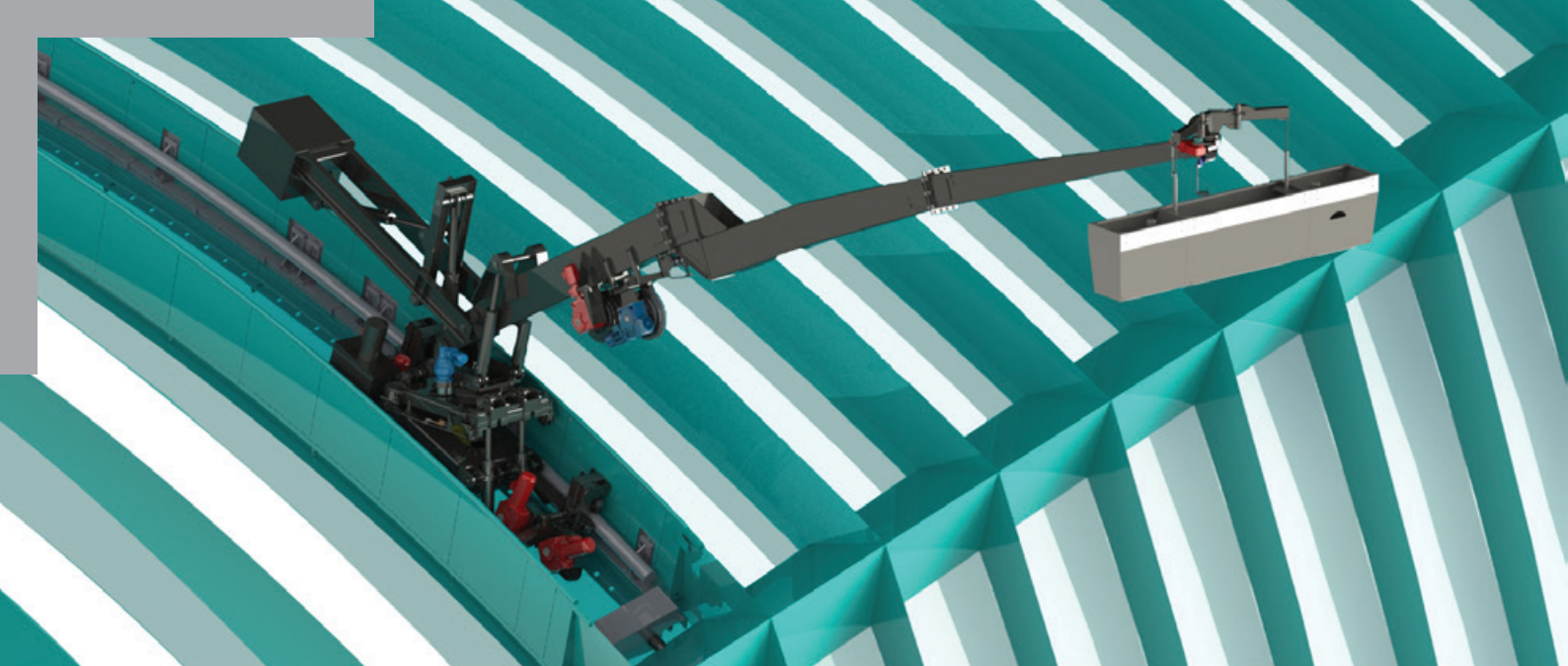
GIFC
Guangzhou
439m

Marina 101
Dubai
426m

Eton Place
Dalian
383m

Federation Tower
Moscow
373m





20 Fenchurch BIM image

A Leading Approach to Quality and Service

Aside from product features, which help us address your project's unique circumstance, there are many other reasons why CoxGomyl is the vendor of choice for the world's leading developments.

It Starts with the Design

Using our reference library of thousands of successful jobs and sub-assemblies, the CoxGomyl design engineers create solutions tailored to the variables of your project. This includes the structural heights, shape and nature of exterior surfaces, maintenance cycles, building loads, operational safety, roof access, slopes, protrusions and concealment options.

With the latest 3D software installed, we model the interface of our equipment enabling you to integrate solutions into your Building Information Model (BIM). Critical structures are designed using Finite Element Analysis (FEA) to manage stresses, loads and weight optimisation. Our shared challenge is to ensure your work of art maintains its masterpiece status well into the future.

Engineering Standards

Our approach to engineering and design is to produce the most cost-effective solutions that optimally resolve the design parameters without compromising on safety and quality. All CoxGomyl units either meet or exceed the most stringent of international quality and engineering standards. These include:

- Easy and Safe Access – CoxGomyl units are designed with maintenance and servicing in mind. Our engineers utilise the latest 3D modelling and analysis software to create safe, accessible solutions.
- Safety Sensors – A comprehensive range of speed and movement sensors are deployed throughout the systems to prevent accidental overspeed or overloading, to indicate end-of-travel limits, and to monitor power supplies and system levelling.
- Failsafe or Backup Principles – Systems feature multilevel braking for the hoists and for inclined or vertical BMU traversing systems: either three separate braking systems, or two with multiple levels of redundancy.
- Materials Built to Last – Galvanised high-strength steel (primed and painted) and stainless steel are used in our machine construction, with lightweight and extra strong aluminium in the cradles. Our drum hoist technology ensures wire ropes last typically three times as long as traction hoists due to less friction and wear.
- Slew Ring Design – CoxGomyl extra safety margins are far above international standards.
- Emergency Retrieval Principles – These are always a design criteria-never just an optional extra-with CoxGomyl's minimum requirements featuring an ability to lower the cradle to a level where operators can be rescued and provide safe access for maintenance personnel to reach an affected BMU.

CoxGomyl's quality benchmark is further bolstered by the reputation of our key component suppliers, all of whom are world leaders in their fields. We use the leading German brand of gear motors and motor controllers, German hydraulics, Swiss wire ropes and Japanese advanced sensor programmable logic controllers.

Installation and Project Management

With our global network of offices and trained technicians, CoxGomyl has managed the installation process of 7000 projects directly. Regardless of whether your project is in Moscow, London, Chicago, Abu Dhabi or Shanghai, you will deal with us from end to end. **For more information, please see our separate publication on Design, Project Management and Installation Services.**

Maintenance Services

CoxGomyl are available to manage the maintenance servicing of your equipment, ensuring it operates at optimum efficiency throughout its life.

As with all capital goods, inadequate maintenance inevitably results in reducing the life of your asset and increases the risk of failure. For those who have fully maintained their CoxGomyl equipment, however, units that were installed 35 years ago are still working reliably today.

When you choose CoxGomyl, you choose the manufacturer who both designed and produced your equipment, who has access to original equipment spares and who will still be there in thirty years, like your building.

For more information, see our separate publication on Maintenance Services.



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