

# Prolec PMX - Confident Construction

James Fisher Prolec has developed a sophisticated suite of product enhancements based on its PME 500 machine envelope control system that significantly improves efficiency and safety by automatically setting height, reach and slew limits with minimal operator involvement.

## Applications



### Construction

PMX provides the opportunity to quickly establish the location of complex vertical, height and depth restrictions meaning that whenever machines move on site, their limit settings are automatically re-established relative to their location.



### Rail

PMX enables machines to complete different tasks on site without the need for the operator to cancel or reset their operating limits meaning asset integrity and safety is maintained at all times. PMX-TST continues to monitor machine location relative to hazards in the absence of GPS allowing the same assurance in built up areas, in cuttings or at tunnel entrances.



### Highways

PMX allows geo-fencing of fixed location hazards, such as live traffic lanes, overhead cables and gantries over several kilometres which can then be updated on site as additional hazards are introduced. PMX will support several machines in the same zone working from the same hazard reference model, meaning assets can be deployed more efficiently and safety is assured at all times.



### Rivers

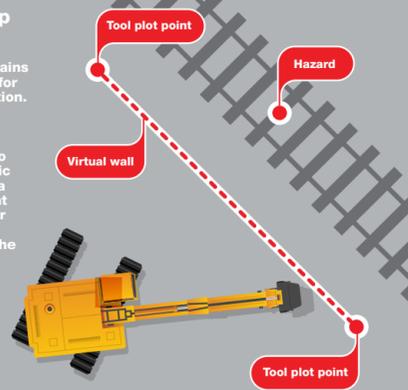
PMX offers the ability to set multiple height limits based on known hazard locations such as overhead power cables together with depth limits to prevent over-dredging and maintain bank stability. When survey data is available PMX also offers a visual guide to the operator in instances where the tool point is submerged. In 2018 Travel Limitation will be included as an enhanced safety feature to prevent either the tool point or machine from entering a hazardous area while travelling.

## PME 500

### Manual set up on site

The excavator remains in a fixed position for set up and excavation.

PME 500 uses manually plotted points in relation to the machine's static location to create a geo-fence or height restriction however the limits must be re-set every time the vehicle moves



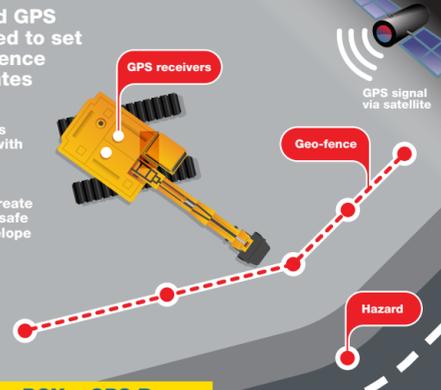
PME 500

## Excavator centric

## PMX-Geo

### Hand held GPS Rover used to set the geo-fence co-ordinates

PMX-Geo combines this information with GPS satellite tracking of construction vehicles to create a site-based safe working envelope

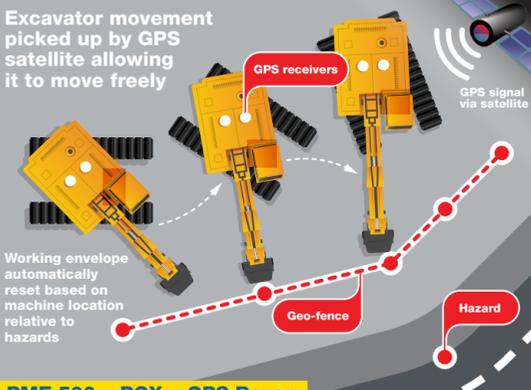


PME 500 + PCX + GPS Rover

## Site centric

### Excavator movement picked up by GPS satellite allowing it to move freely

Working envelope automatically reset based on machine location relative to hazards

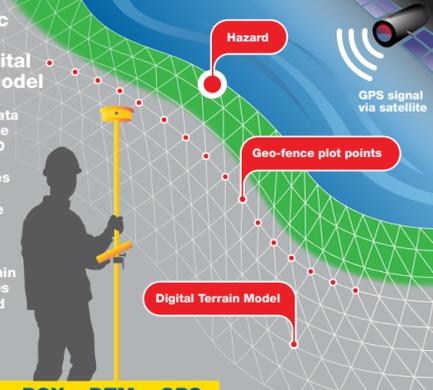


PME 500 + PCX + GPS Rover

## PMX-DTM

### Automatic set up using Digital Terrain Model

Site survey data is used off site to create a 3D DTM which PMX combines with GPS data to create a remotely generated safe working envelope within which vehicles can freely and safely move and work

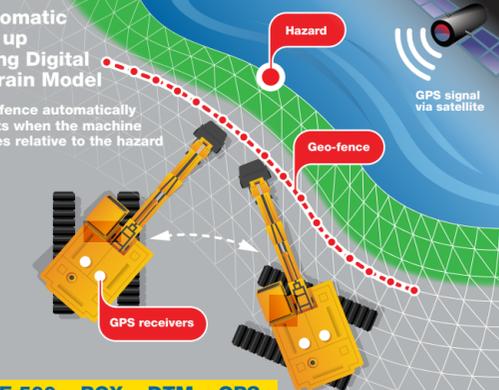


PME 500 + PCX + DTM + GPS

## Site and Design centric

### Automatic set up using Digital Terrain Model

Geo-fence automatically resets when the machine moves relative to the hazard

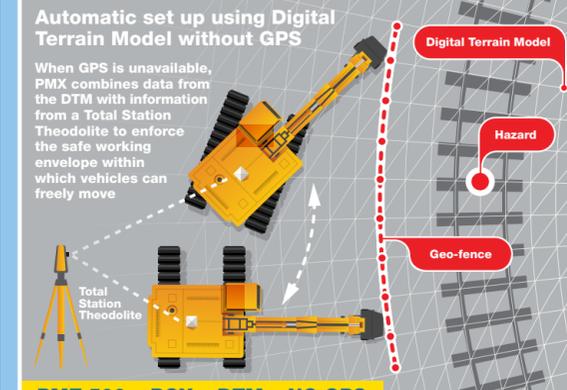


PME 500 + PCX + DTM + GPS

## PMX-TST AVAILABLE 2018

### Automatic set up using Digital Terrain Model without GPS

When GPS is unavailable, PMX combines data from the DTM with information from a Total Station Theodolite to enforce the safe working envelope within which vehicles can freely move



PME 500 + PCX + DTM + NO GPS

The new JF Prolec PMX system is a world first in accurately tracking machine location using GPS and TST technology to automatically update limit settings based on hazard geo-fencing. Once hazards are identified, the system continuously monitors the machine's location and proximity and calculates the necessary restriction in movement based on the geometry of the machine to create a safe working envelope. In this way, PMX delivers increased productivity, accuracy, and safety through reduced operator workload and site-wide control of multiple machines.

## The benefits

The existing Prolec PME 500 allows operators to establish restrictions on height, reach and slew to create a safe working envelope based on the machine's position and geometry. It can be a laborious and time-consuming process to work on complex hazard geometries, over long distances, because the limits need to be cancelled and reset every time the vehicle is moved.

Prolec's new suite of product evolutions, PMX, offers enhanced productivity, time efficiency, accuracy and safety as hazard locations only need to be defined once (either on-site or externally), and then any machine equipped with PMX can establish its own limits by comparing its location to that of the hazards to create a safe working envelope with minimal additional input.

This new feature significantly reduces the risk of human error, accommodates a broader skills range and reduces operator workload to significantly enhance productivity and increase the safety of any site operations.

## How it works

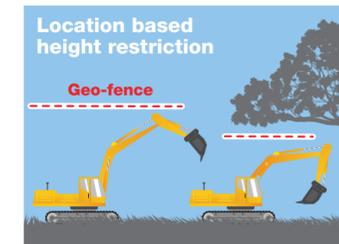
Although the Prolec PME 500 system provides a widely used self-limiting function for construction equipment, PMX offers advanced functionality which can be tailored to the location and specific hazards encountered on any site.

A hand-held GPS Rover can be used to define a number of hazards and their location (such as geo-fences, height restrictions and depth limits). This information is uploaded to the PMX system to create a hazard reference model (GEO) which PMX compares to the machine's location in real time. When the machine is in position, PMX automatically updates slew, reach and height limits and constrains movement to ensure this envelope is not exceeded.

This functionality can be advanced further for sites which have existing survey data (such as LIDAR, Laser Scan, Topographical, or 3D Photogrammetry). Designers and engineers can remotely create a detailed 3D Digital Terrain Model (DTM) of the site which can be used with any locally created hazard reference model to allow PMX to accurately define the position of the safe working envelope.

When there is no reliable GPS signal, for example in tunnel entrances, cuttings or built up areas, PMX can switch to using Total Station Theodolite (TST) tracking technology to determine a machine's position in relation to a known location using either GEO or DTM methods.

## Additional features



### Height

A virtual height restriction works in the same way as 'geo-fence' with the system taking account of unlimited variations in height restriction at any location on any site.



### Depth

A 'control trench' of infinitely varying dimensions can be set to intelligently avoid buried and unseen hazards, even as ground level changes.



### Travel Limitation

Sophisticated new formatting will allow for separate geo-fence limits for the machine body distinct from its tool point - this is particularly useful for riversides where the machine might need to be positioned 2m away from a hazard, but the tool point can safely extend into work zone.

# Prolec PMX: Confident Construction options list

	PME 500	PMX-Geo	PMX-DTM	PMX-TST
<b>Machine</b>				
PME 500	●	●	●	●
PCX-Pro	—	●	●	●
Twin RTK antennas	—	●	●	○
Inertial compass	—	—	—	●
<b>Site</b>				
GPS Rover	—	●	○	○
GPS Base Station	—	●	●	○
Total Station Theodolite	—	○	○	●
<b>Office</b>				
Survey data	—	—	●	●
DTM meshing tool (PRO-job)	—	—	●	●
Hazard definition (Bentley / Autodesk etc)	—	—	○	○
Visual Asset Management (R2S Mosaic)	—	○	○	○
<b>Features</b>				
Height, slew and reach limit	●	●	●	●
RCI / RCL	●	●	●	●
Smart Trenching	●	●	●	●
Automatic limit setting	—	●	●	●
Travel Limitation	—	A V A I L A B L E 2 0 1 8		

KEY: ● Included ○ Optional extra — Not available

## PMX: Confident Construction



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## PMX: Confident Construction

Creating the ultimate safe working envelope system  
to enhance safety, productivity and efficiency