OSPREY
BY JETTING SYSTEMS

PRECISION RUNWAY RUBBER REMOVAL

OSPREY

RUNWAY RUBBER AND PAINT REMOVAL SYSTEMS

THE WORLD'S MOST ACCURATE SURFACE COATING REMOVAL SYSTEM FOR RUNWAYS AND HIGHWAYS

GET THE OSPREY ADVANTAGE

Osprey is the world's most accurate and controlled runway rubber removal and paint removal system for airports. Whether a small regional airport or a major hub, we have solutions that save you money and keep you compliant.

What Osprey Offers

Precision runway rubber removal
Osprey's computer-controlled cleaning head delivers consistent and accurate performance, removing runway rubber, minimising environmental impact and driver fatigue.

- Computer controlled for maximum rubber removal
- Minimal human input required
- Consistent performance with up to ±0.5mm accuracy
- Operates in all conditions (-6°C to +50°C)
- Multiple purpose – deep and rapid clean
- Multiple locations – road legal models available
- Environmentally friendly – no chemicals or abrasives
- Reduced driver fatigue – low vibration

Quick with minimal downtime
Hydraulically operated cleaning heads means Osprey can deploy and evacuate an area in seconds, whilst the computer-controlled head allows the cleaning width to be adjusted from the cab[1].

- Minimal runway down-time – deploys in under one minute
- Fast operation time – linear system capable of 4000m^2/hr
- Reduced turnaround times – large tank capacities

Low whole-life cost
Osprey offers the lowest operating cost of any manufacturer, with deeper cleaning meaning longer times between operations, and no damage to the surface or lighting systems.

- Minimal overlap and missed areas
- Deeper clean means greater time between operations
- Single operator capability
- No damage to runways
- Minimal maintenance
- Built to last, with key components fabricated and machined from stainless steel

1 - Cab adjustable widths available on all lateral models

A KEY FACTOR TO FLIGHT SAFETY

Runway and taxiway excursion accidents are the most frequent type of air accident worldwide, often resulting in loss of life and injuries for passengers and crew along with severe disruption and reputational damage for airports. Airports can significantly reduce the likelihood of such accidents by taking their obligations seriously to test and maintain runway friction and visibility of line markings.

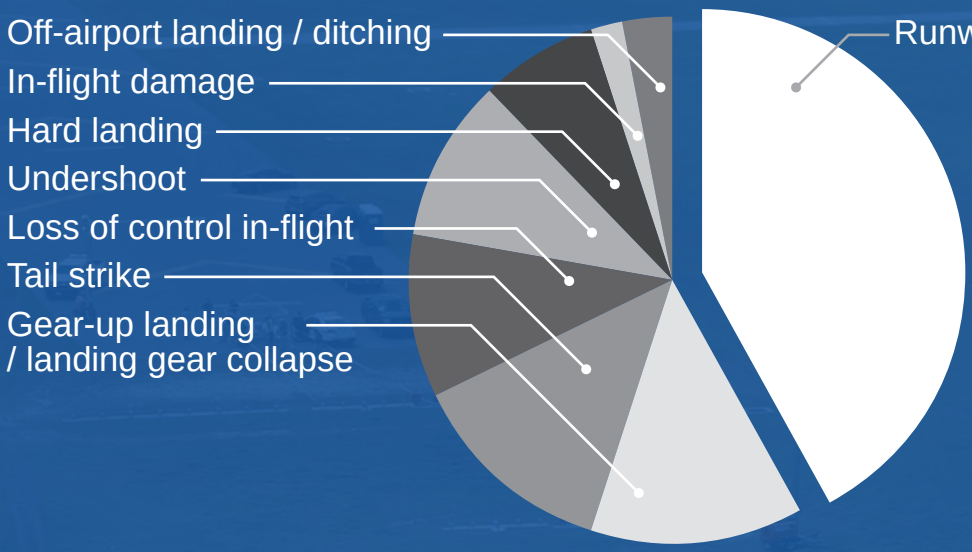
As a pilot on final approach in a storm, being informed of poor runway friction values is helpful, but being provided with a runway that will grip, is well marked and illuminated is far preferable. Unlike high touchdown speed, thrust reversers, speed brakes, unstable approaches and tailwinds; limited friction is the one aspect airport operators can control.

The issue with rubber

As an aircraft comes into land and touches down on the runway, its tyres are accelerated extremely quickly by the passing runway. The heat produced burns the tyre rubber into the runway surface. The pores in the asphalt or concrete are thus gradually filled and closed causing the surface to lose its roughness. The available friction (grip) therefore decreases for following landing aircraft. The effect is made worse, as the heat caused by the wheels spinning up changes the chemistry of the rubber, turning it into a hard, glass-like deposit.

This effect is most pronounced in the touch down zones where the wheels 'spin up' and along the centre line of the runway where braking action occurs. This is exactly where following aircraft require the most grip for subsequent landings.

The mass of rubber deposited by each landing varies greatly and is difficult to measure, but we estimate that for a busy airport, around one to two tonnes of rubber may need removing every day to maintain safe and legal friction values.



Around 42% of all aircraft accident end states in 2017 were due to runway or taxiway excursions. The Osprey system improves runway friction by removing rubber depositis and ensuring line markings remain visible.

Source IATA Accident Database

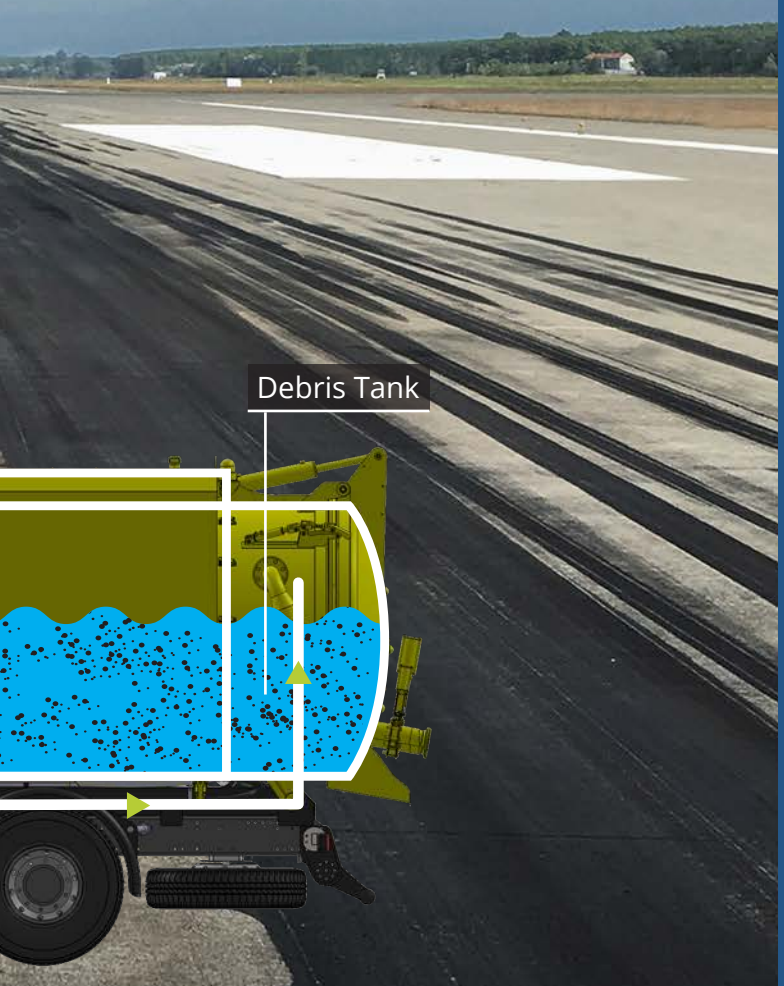
Even when not directly attributed to runway excursions, the amount of friction provided by a runway's surface is critical to an aircraft's ability to brake effectively.

Image: NTSB

KIND TO CONCRETE

Osprey uses an ultra-high-pressure water pump capable of delivering a laser-like stream of water to the runway surface through the jetting head at pressures up to 2500 bar[1]. Water and debris is then removed from the head under vacuum, leaving a dry surface, ready for aircraft operations to resume immediately, and causing no damage to the runway surface.

1 - Maximum pump rated pressure 2850bar (Uraca KD724)



Clean water is passed to the Cleaning Head through an Ultra-High Pressure Pump. Water and rubber or paint is then removed from the head under vacuum and passed to the debris tank.

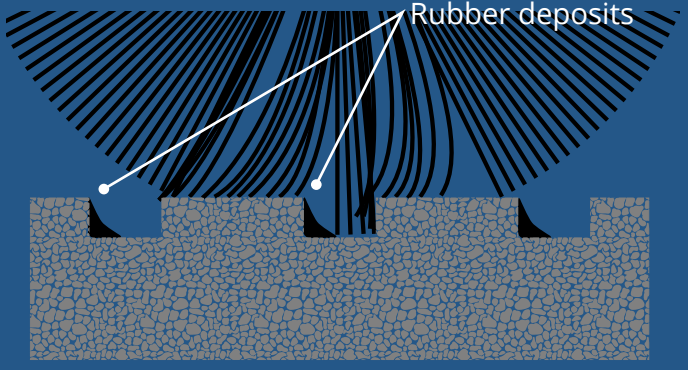
Cleaning methods compared

Traditionally, rubber and paint deposits have been removed from runways using either mechanical or chemical processes.

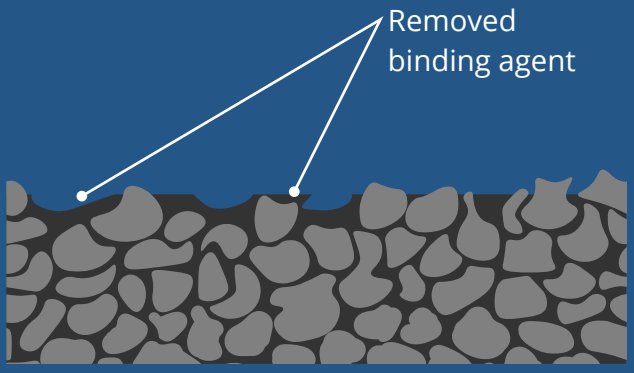
Mechanical processes such as rotating brushes can miss cleaning both sides of the runway's friction/water run-off grooves, whilst chemical or shot-blasting processes require large amounts of water and use beads or detergents that can be harmful to the environment.

Both techniques can also erode the runway surface, further degrading the water run-off channels and potentially increasing the need for re-surfacing.

However, Osprey's ultra high-pressure water jetting efficiently removes rubber and paint deposits, thoroughly cleaning water run-off channels without harming the runway surface or runway lighting. Debris and water is automatically collected by the Osprey vehicle, leaving the runway dry and ready for aircraft operations.



Mechanical removal methods can miss cleaning both sides of the water run-off grooves, reducing their effectiveness at removing water from the runway.



Both mechanical and chemical methods can also remove the asphalt or other binding agent used within the runway surface, increasing the need for more regular resurfacing.

KEY FEATURES

Over 25 years, we have fine-tuned the Osprey design, adding new technology as it becomes available and perfecting each component to create the best possible surface cleaning system.

1. **Insulated cabinet**
   Sound reduction, security and weather protection.
2. **10 micron and 1 micron water filtration**
   Longer pump, nozzle and valve life.
3. **Roller shutter doors**
   Lockable for security.
4. **High visibility beacons**
   Compliant with airport regulations.
5. **Width adjustment on touch screen in driver's cabin**[1]
   Width adjustment of the rubber removal system without the need for tools.
6. **Additional front work lights**
   Excellent night time visibility.
7. **Multiple nozzles**
   Result in lower impact per nozzle and more gentle rubber / paint removal.
   Small diameter removal head[1]
   Low surface impact.
8. **Highly efficient vacuum system**
   1300m^3/ hr, 200 mb vacuum. Maximum recovery of water and debris. No need for additional suction equipment.
9. **Front mounted head**
   Better visibility.
10. **No need to remove rubber removal device for road transport**
    Fast, convenient and with no need for additional vehicles.
11. **Adjustment from 300mm – 2200mm from within drivers cab**[1]
    No tools required.

12 **Lights and direction indicators visible with robot raised**
No need to remove robot for road transport.

13 **Standard road going chassis**
Mass produced, available spare parts, easy maintenance.

14 **Mechanical reduction gearbox**
Simple operation. Minimal hydraulics. No possibility for oil leaks.

15 **Side mounted work lights**
Better night time visibility.

16 **Motion control system**
Ensures vehicle is moving before high pressure water is applied to the pavement Surface. Zero possibility for damage.

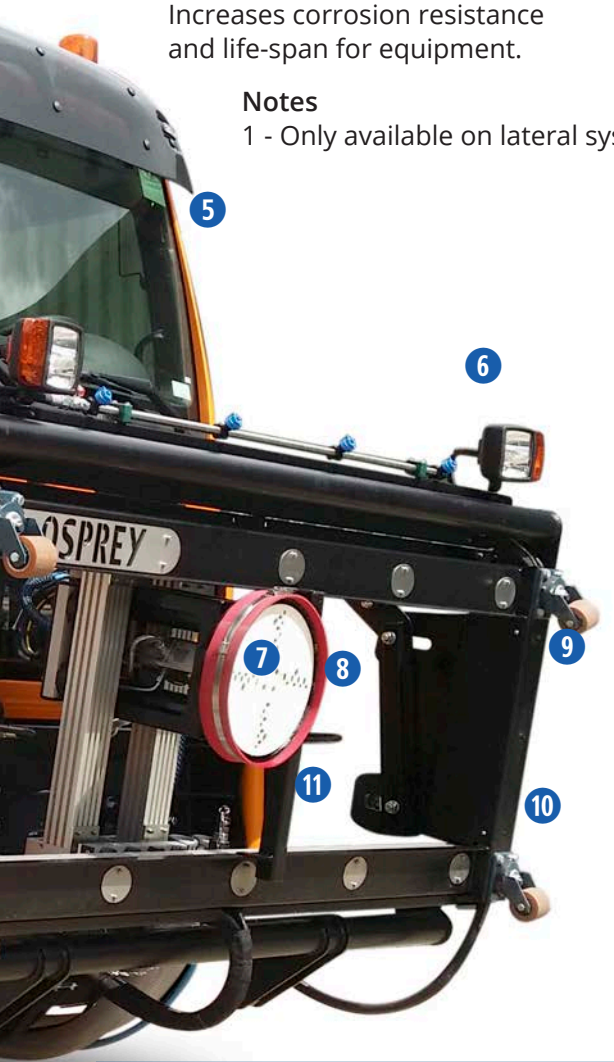
17 **Optional Multi-Surface Cleaning unit**
Allows linear and lateral rubber / paint removal with one vehicle.

18 **Vehicle drive is through chassis wheels**
Zero slippage and better speed control.

19 **Modular stainless steel water and tipping debris tanks**
Reduced surge for added safety and comfort when driving. Tipping debris tank for rapid turnaround times.

20 **Stainless steel tanks with pickle and passivation process**
Increases corrosion resistance and life-span for equipment.

Notes
1 - Only available on lateral systems



Lateral vs. Linear cleaning

Jetting Systems are the only manufacturer worldwide that offers both lateral and linear rubber removal systems. As such, we can explain the benefits and disadvantages of each method.

Linear cleaning

- Uses one or more fixed cleaning heads
- Quick at cleaning centre lines (single pass)
- High forward speed means operator may miss patches or go over them twice
- Less expensive initial outlay compared to lateral machine

Lateral cleaning

- Uses one smaller cleaning head that moves across the entire width of the vehicle as it moves forward
- Quick at cleaning wider areas (touchdown zones)
- Width adjustment controlled from cab
- Smaller jetting head means deeper cleaning is possible - without damaging the surface
- Highest level of rubber removal on all surfaces

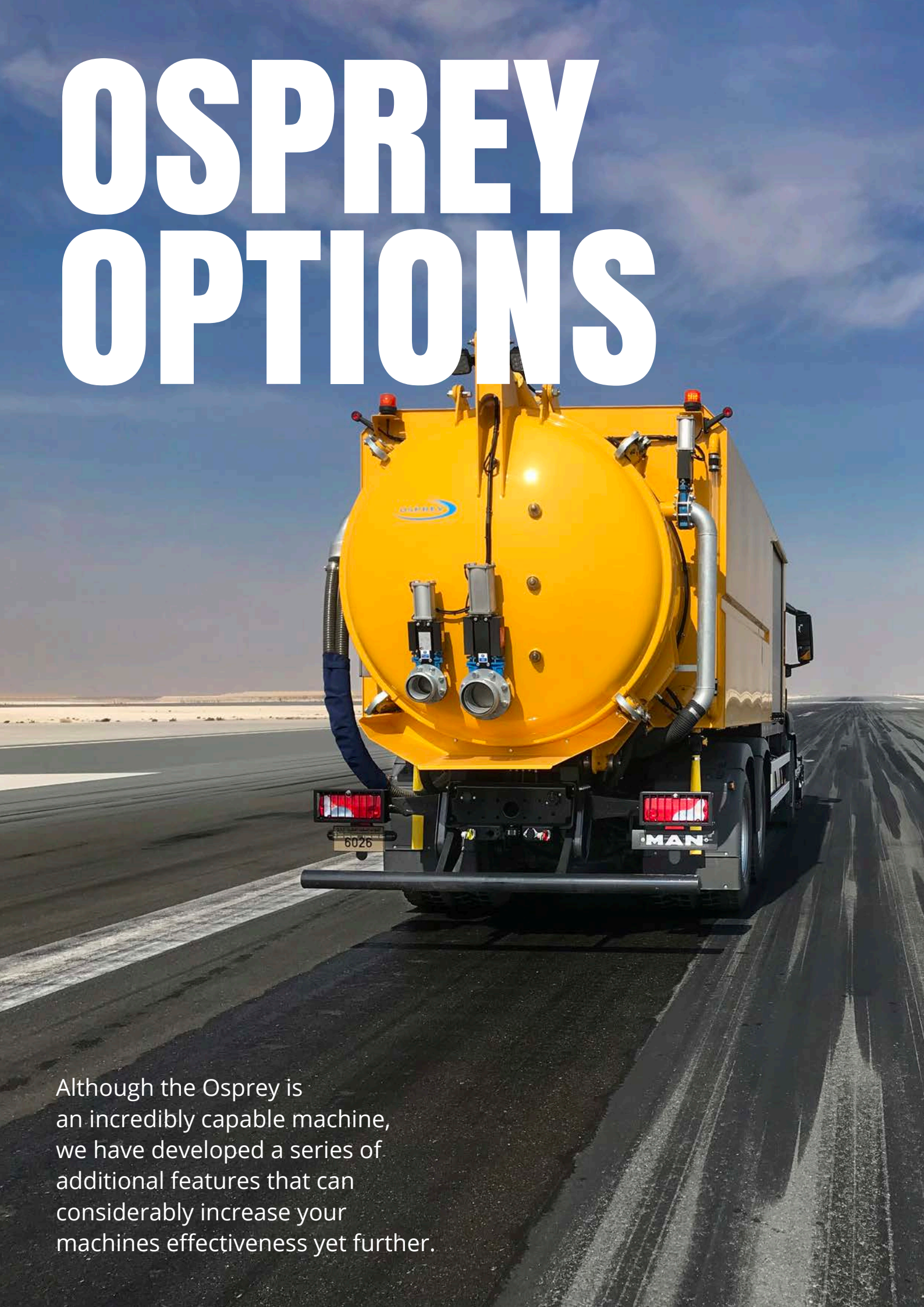
Technical Specifications

Every Osprey is custom built to meet every customer's specific requirements. As such, this table only provides example specifications for models we have previously built.

	Linear	
		
	LI750 (Trailer)	LI 1000 / 33
General		
Number of cleaning heads	1	2
Removal width	Fixed (200 - 750 mm)	Fixed (200 - 1000 mm)
Performance	1000 - 1700 m^2/hr	1000 - 2000 m^2/hr
Rotation method	Hydraulic	
Control	Cab mounted control	
Deployment method	Hydraulic lift	
Set-up / Evacuation time	<1 min	
Chassis		
Manufacturer		MAN, Volvo, Mercedes, Sca
Axle configuration	n/a	4 x 2 or 6 x 2 (4)
Weights and Dimensions		
Gross Weight	6000kg	10000 - 35000kg
Length	6.4m	8.4 - 11m
Width	2.54m	2.548m
Height	3.4m	3.8m
Speed reduction system		
Type	n/a	Mechanical or hydrostatic
Ratio	n/a	17:01
Actuation	n/a	Pneumatic
Speed range	n/a	200 - 6000 m/hr
Ultra High Pressure pump		
Maximum water flow	28 l/min	28 l/min
Typical operating pressure	2200 - 2500 bar	
Clean water tank		
Nominal capacity	4500 l	3500 - 10000 l
Material	Polypropylene	304 stainless steel
Anti-corrosion protection	n/a	Pickle and passivation
Debris recovery		
Nominal tank capacity	5000 l	6000 - 12000 l
Material	Mild steel	304 stainless steel
Vacuum system air flow	28 m^3/min	28 m^3/min
Controls		
Cabin controls	Jetting head deployment and recovery, Water pressur Rubber / paint removal selection, 9" colour monitor ar rear-mounted cameras.	
External controls	Debris door locks, Debris door open / close, Debris tar	

		Lateral	
			
LI 1500 / 33	LI 1800 / 33	LA2200 / 28	LA 2200 / 42
3	4	1	
Fixed (300 - 2200 mm)	Fixed (300 - 2200 mm)	Variable (300 - 2200mm)	
1000 - 2500 m^2/hr	1000 - 4000 m^2/hr	800 - 1200 m^2/hr	800 - 1400 m^2/hr
		Hydraulic	
		CNC servo motors	
		Hydraulic lift	
		<1 min	
nia, DAF, Hino		MAN, Volvo, Mercedes, Scania, DAF, Hino	
6 x 2 (4)	6 x 2 (4)	4 x 2, 6 x 2 (4) or 8 x 2 (4)	8 x 2 (4)
		18000 - 33000kg	
12m	13m	8.4 - 11m	
		2.548m	
		3.8m	
		Mechanical or hydrostatic	
		17:01	
		Pneumatic	
		200 - 6000 m/hr	
42 l/min	42 l/min	28 l/min	42 l/min
		2500 - 2800 bar	2800 bar
		3500 - 10000 l	
		304 stainless steel	
		Pickle and passivation	
		6000 - 12000 l	
		304 stainless steel	
56 m^3/min	56 m^3/min	22 m^3/min	
e control, Auxiliary engine speed and monitoring, nd optional video recorder, connected to front and		As linear models, but with additional controls for cleaning width, high pressure water on/off, forward speed control, and speed reduction system engage / disengage	
nk tip		Debris door locks, Debris door open / close, Debris tank tip	

OSPREY OPTIONS



Although the Osprey is an incredibly capable machine, we have developed a series of additional features that can considerably increase your machines effectiveness yet further.

Laser Guidance

Further improve the accuracy of night-time operations

Whatever rubber removal system you choose, it can sometimes be difficult to determine which areas have been cleaned and which have not – particularly at night time or in wet conditions. The optional vehicle mounted laser enables the operator to clearly see the cleaning edge, ensuring areas are not missed or over-cleaned.

GPS Tracking

Focus cleaning operations on key areas

Traditionally, identifying which areas of runway to clean has been left to the vehicle operator, which can be a challenge given operations generally occur at night, leaving potentially hazardous patches of runway left uncleaned. By working with Sarsys-ASFT friction measuring solutions, we can provide operators with a GPS-linked visual display showing which areas require attention.

Power Take Off (PTO) Drive

Increase engine efficiency and reduce emissions and maintenance by using your Osprey's chassis engine

The PTO drive removes the need for a secondary engine. Although slightly more expensive initially, maintenance times, running costs and emissions are halved. The smaller size of a PTO drives, also allows you to select a smaller chassis or increase the size of the water and debris tanks.

Combined Lateral and Linear Units

Fast linear cleaning and deep lateral cleaning combined in one unit.

Jetting Systems have combined both linear and lateral systems into one multi-surface cleaner. This offers fast linear cleaning for centre lines etc, and a more effective approach to cleaning larger areas such as touch-down zones, by using the lateral unit.

RAPTOR
AUXILIARY VEHICLE

The Raptor is designed as a remote operating tool, increasing the versatility of the Jetting Systems Osprey. The Raptor may be fitted with articulating single arm for line marking removal or with a rubber removal / large surface area cleaning unit for surface cleaning in tight areas.

The hydrostatic drive system enables the operator to control the forward speed accurately and our unique chassis design steers from the centre point between the front and rear axles, you can be confident that any obstacle that you have passed with the cleaning head such as ground lighting will also be passed safely by the rear of the machine.

Extend the reach of Osprey

- Reaches locations and tight areas inaccessible to larger units.
- Significantly more effective than manual cleaning and removal methods
- Safer than using hand-operated equipment

Easy to operate

- Operator able to control speed accurately.
- Highly manoeuvrable with ±55° articulated steering.

AFTER SALES SUPPORT

With Jetting Systems, you will get the best possible support. Our rapid response service and commissioning team are always available to advise and assist by telephone, email or VoIP or carry out site visits as required. And should something go wrong, we offer a rapid spares service to get your vehicle repaired as fast as possible.

Support when you need it

First class after sales support is vital to ensure that any queries are attended to in a quick and efficient manner and that any spare parts are supplied without delay. Our engineers are available by phone or email and can usually respond immediately or within 3-4 hours if outside our normal working hours.

Quality Spares - fast

We can generally supply any spare part within 24 hours. Spare parts availability is guaranteed for a minimum of 10 years.

We only use component manufacturers that have a reputation for good spares support, ensuring that your equipment remains maintainable long into the future. In addition, by using the latest Solid Works 3D design package, we guarantee that any custom components we supply in the future can be quickly manufactured and will be compatible with your machine.

Clear and comprehensive documentation

All equipment is provided with a comprehensive document pack, including operators and maintainers manuals, test certification and technical drawings. We maintain a duplicate set of documents, along with manufacturing records for every machine we supply, allowing us to quickly resolve issues should they arise.

Local support and training

We pride ourselves on providing you with the personal touch, and ensure that your operators and maintainers know how to get the best out of their Osprey. On delivery of the equipment, your team will receive training sessions on both maintenance and operation. Our field engineers will then continue to stay in contact, visiting you on-site to ensure you continue to get the maximum return out of your investment.

ABOUT JETTING SYSTEMS

Jetting Systems is the largest manufacturer of runway rubber removal systems in the UK. Established in 2003 by Simon Carling, today we serve customers in over 25 countries around the world.

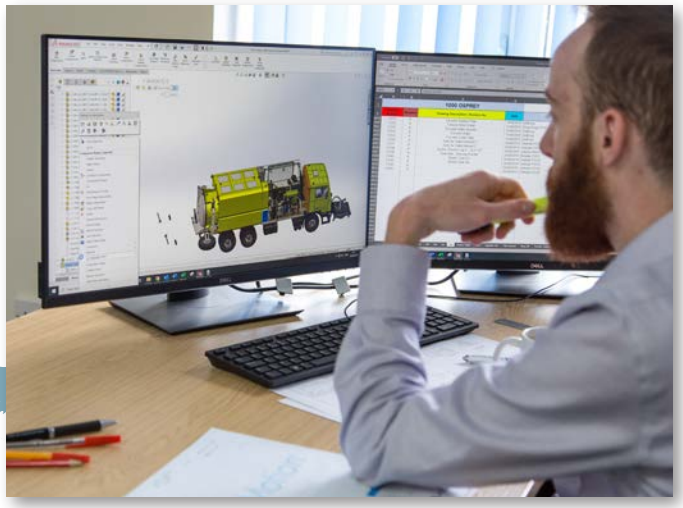
British Engineering at its best

In 1992, we designed and supplied the world's first truck mounted combined water jetting and vacuum recovery runway rubber removal unit to Kai Tak International Airport in Hong Kong. Since then, we have developed a reputation for producing high-quality equipment and exceptional customer service. Vehicles are designed with ease of operation and maintenance in mind, whilst we use the best possible materials and equipment to ensure reliability.

Design, assembly, inspection and testing is undertaken in our own modern, well equipped facilities located in the south of the UK, where we operate to ISO9001 quality standards, with each stage of assembly including stringent inspection processes and final acceptance testing replicating the actual operational conditions.

Following delivery, we will ensure everything operates as expected, and work with you to ensure your operators know how to get the best out of your equipment.

Osprey rubber removal systems can be found around the world, operating in conditions ranging from the Arctic to the Equator, and at locations ranging in size from small regional airports to the largest hubs.



Fact check

When investing in new equipment, it's important to make sure you make the right choice. Jetting Systems has built a reputation for providing honest advice to operators as to what technology is most appropriate for their requirements. And as the only water blasting manufacturer to offer both linear and lateral systems, we can impartially recommend the system that works best for you.

What our competitors say

"XXX were the first in the world to offer a complete system with simultaneous vacuum recovery on a single truck chassis."

Not true. Our founder, Simon Carling, supplied Kai Tak airport in Hong Kong with a single-chassis solution in 1992.

"XXX are the only waterblasting company with repeat sales to airports."

Not true. We have had repeat airport sales in Hong Kong, Turkey, Nigeria and Qatar.

"Lateral cleaning requires significant overlap and is therefore only 65% efficient."

Not true. The amount of overlap is no greater than with a linear system. As the vehicle moves forward, there is negligible overlap to the sides, and only 0-5mm of overlap on each pass of the jetting head. This is further reduced by minimising any overlap caused by driver error as the vehicle moves forward more slowly than on a linear machine.

"Having a locally sourced chassis is cheaper and means better, local support."

Not True. Some manufacturers offer a kit of parts for you to adapt onto a local chassis. We have found this solution never works as well as a properly designed system, factory built by professionals.

We work with all main vehicle manufacturers, including MAN, Volvo, Scania, Renault, Mercedes and Iveco to ensure we select the chassis with the best support for wherever you are in the world.

Consultation

We provide comprehensive and honest advise on choosing a rubber removal solution that best meets your requirements.

Chassis selection

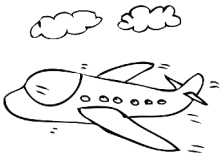
We check which vehicle manufacturers offer good support in your country.

Quotation

We provide you with a comprehensive proposal including fully-costed options.

Manufacture

After receiving your order, we start building your Osprey, with the chassis delivered direct from the manufacturer.



Factory Acceptance

Upon completion, we invite you to the UK to visit Jetting Systems and to view your Osprey. Whilst here, we can arrange a tours to see more of our country.

Testing

Prior to shipping, a comprehensive testing programme is conducted to ensure all features on your Osprey are working perfectly.

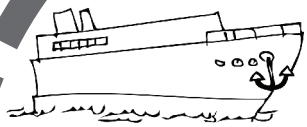
Shipping

We are 20 miles from Southampton - the largest international vehicle port in the UK. Agreed stocks of spares are packaged and shipped within each vehicle.

OWNING AN OSPREY

Delivery

Following arrival at the port of your choice, you will need to get your Osprey cleared through customs, prior to delivery to your location.



Commissioning and Training

Once the Osprey has arrived in your country, we fly out to commission and optimise it. We train and certify operators to ensure safe operation and teach your technicians how to maintain the system

Operation

Your Osprey is then ready for operations, keeping your runways clean and your aircraft and passengers safe.

Spares

In addition to the spares pack included with the vehicle, your Osprey comes with a complete list of reccomended spares, which can be sourced either locally through your agent or direct with Jetting Systems Ltd,

Remote Support

Should any problems arise, Jetting Systems are available 24/7 to provide remote support. By monitoring machine performance over the internet, we are able to provide fast resolution to any potential issues.

Face-To-Face Support

We also offer optional on-site support for major services, as well as training for new operators and maintainers, which can be delivered either at your location or back in the UK.

Every Osprey we create is tailored to meet the owner's specific requirements. As such, we will work with you to develop the optimal rubber and runway cleaning solution to meet your needs.

JETTING SYSTEMS

PRECISION RUNWAY RUBBER REMOVAL

Jetting Systems Ltd
Unit 2, Batten Road, Downton Business Park
Wiltshire SP5 3HU United Kingdom
t: +44 1725 514 873
e: osprey@jettingsystems.com

www.jettingsystems.com

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