NODIN AVIATION AS

YOUR NEEDS - OUR KNOWLEDGE - EQUALS INNOVATION

Casualty and Medical evacuation and treatment facilities.

Air, Land and Sea.

NODIN - Norwegian Development and Innovation

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CASEVAC

- Increase capacity and availability of stretcher carrying units for transport of casualties.
- Enhance the survivability of casualties by reducing time from injury until treatment is started.
- Reduce vibrations and shocks, inflicted to patients during transport, to reduce pain and avoid additional complications.

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Shock and Vibration-damped Stretcher Rack System

- Vibrations and jolts during transport of patients can, in addition to inflict unnecessary pain, in some cases worsen the patient conditions and even result in loss of life.
- In motorized vehicles and vessels one will always experience vibrations during transport and for off road evacuations; jolts are almost impossible to avoid. To avoid inflicting unnecessary pain and in worst case loss of life these conditions needs to be improved.

Patient conditions

- Some conditions where vibrations and shock inflicts unnecessary pain to the patient:
  - Fractures
  - Burns
- Examples of conditions where vibrations and shock can be life threatening:
  - Damage to internal organs/internal bleeding (shot/blast wounds)
  - Head and neck injuries

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Shock and vibration-damped Stretcher Rack products

- In vessels and off road vehicles one experiences unpleasant movements in all directions.
- An effective dampening must therefore be spherical to manage loads in all directions.
- The Nodin Aviation products; NT-620 and NT-630 are both developed to solve this issue.

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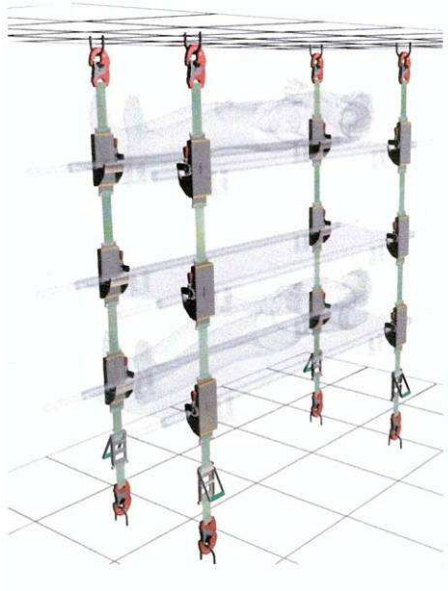
NT-620, Shock and vibration damped stretcher rack



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Equipment data

- NT-620, Role Equipment, developed for transportation of patients on standard stretchers, providing fast and flexible mounting in military or civilian boats and land-based vehicles.
- The system reduces unpleasant vibrations and jolts to a safe and comfortable level and has a unique shock absorbing effect.
- With preinstalled anchoring points a vessel or vehicle can change its role into a CASEVAC unit within minutes and enable it to evacuate stretcher patients without having to wait for a specialized ambulance.

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Configurations

- The Stretcher Rack System can be delivered in three versions:
- NT-620/1 for one stretcher
- NT-620/2 for two stretchers
- NT-620/3 for three stretchers
- Distance between stretchers according to customer request.
- Please see technical details in next slide:

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Technical Data

NATO Stock No: NSN-6530-25-151-3596

System	Sc	Dm	Wr	Lc	Ua	La	Lm	Ds	Md	Mw
NT-620/1	1	0,90 m	12,2 kg	130 kg	4000 N	4000 N	15800 N	0,017 m³	AISI 316 SS	Polyester 50mm
NT-620/2	2	1,35 m	20,6 kg	250 kg	7000 N	5000 N	15800 N	0,025 m³	AISI 316 SS	Polyester 50mm
NT-620/3	3	1,85 m	29,0 kg	380 kg	10000 N	5000 N	15800 N	0,035 m³	AISI 316 SS	Polyester 50mm

Sc: Stretcher capacity in Rack (1, 2 or 3 stretchers).

Dm: Minimum distance between preinstalled upper- and lower- anchoring point.

Wr: Total weight of the Stretcher Rack.

Lc: Recommended total maximum load capacity for the Rack (...to obtain optimal function)

Ua: Required minimum strength for preinstalled upper anchoring point (...safety margin included)

La: Required minimum strength for preinstalled lower anchoring point
(Ua & La are based on up to 10G jolt, 350G shock and 30-40.000G shockwave)

Lm: Maximum steady state load (breaking strength) for each of the four straps in the Stretcher Rack System.

Ds: Dimension stored/packed (...measured in cubic metre)

Md: Material in dampers and hooks.

Mw: Material in web strap (fire resistant according to FAR 25.853-2b)

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NT-620 in different configurations

Fast patrol Vessel

3 stretchers

Armored Shelter

2 stretchers

Armored Vehicle

1 stretcher

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NT-620

- Role Equipment, always present CASEVAC capacity by utilizing “on site” vehicles/vessels.
- 1-2 minutes from the situation occur until patients are loaded in the rack. ”
- Increases the total capacity for CASEVAC or patient transport also for civilian disaster scenarios.
- The unique damping characteristics of the system reduces both pain and the risk for further damages resulting from jolts and vibrations during transport.
- Reduces the effect of mine shocks or IEDs significantly.
- 4 preinstalled anchoring points in the roof, four anchoring points in the floor and a small storage room for the system is all that is needed to gain capacity and ability to save lives.

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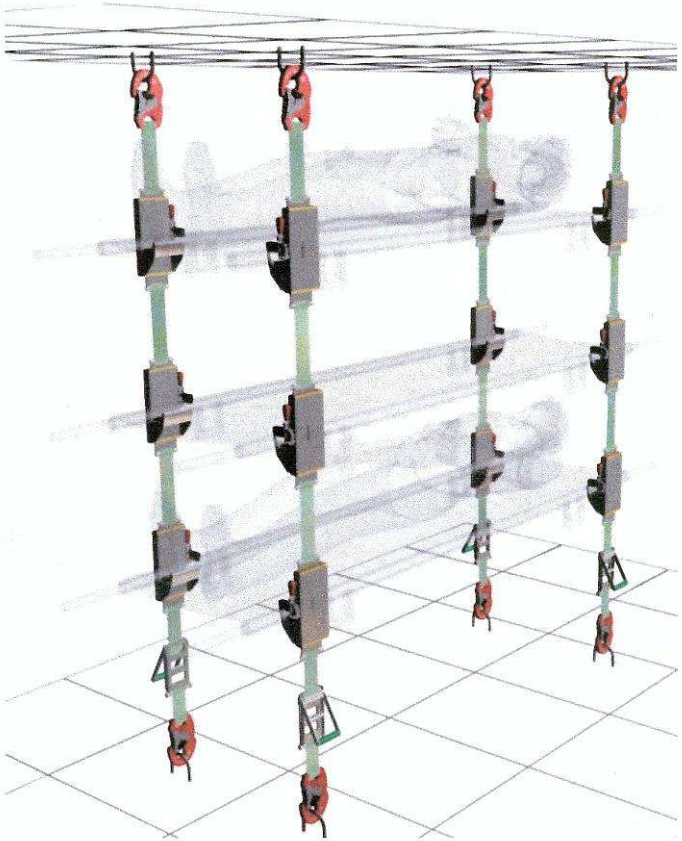
Shock and vibration damped Stretcher Rack

- NT-620, patented solution.
- Individually and spherical damped.
- Progressive damping in all direction.
- No mechanical connection between stretcher and vehicle/vessels structure.
- Modular system, 1 or multiple stretcher positions.
- All components in stainless steel or non corrosive material.
- Role equipment, erected when needed.
- Approx 12 kg per litter- position (three tier – total weight of 32 kg).
- Shock dampening effect has been simulated: input 440g at 0,31msec, residual shock 3,9g.



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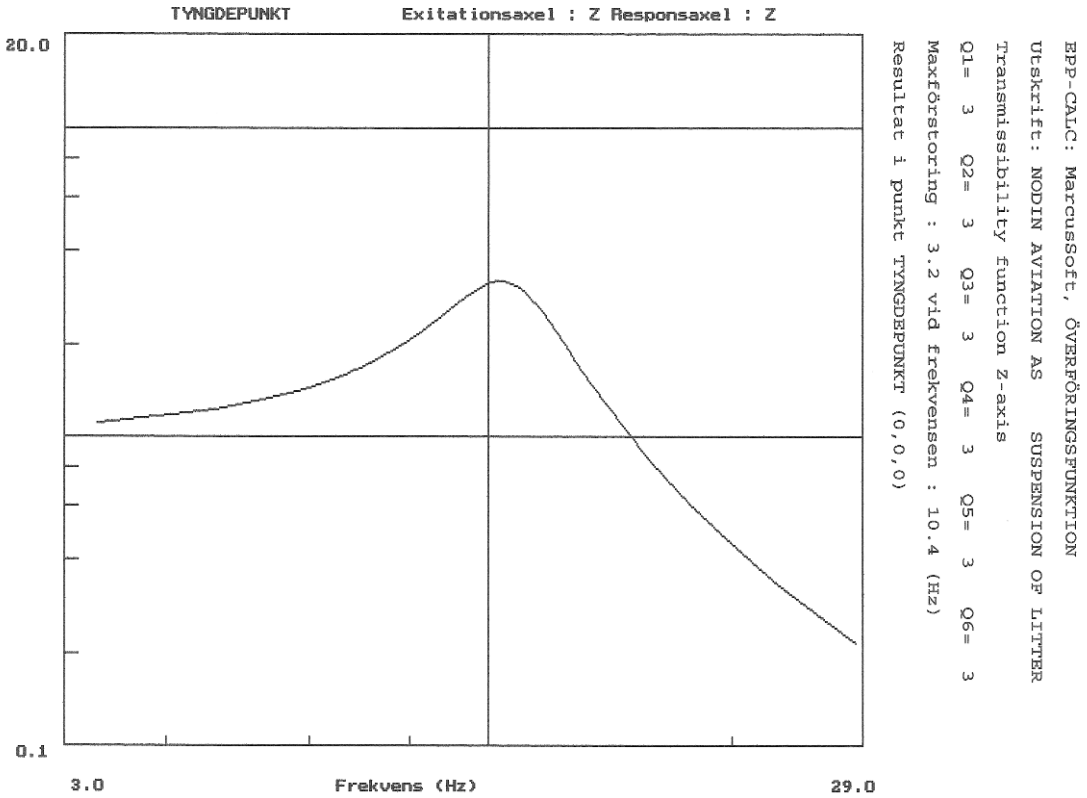
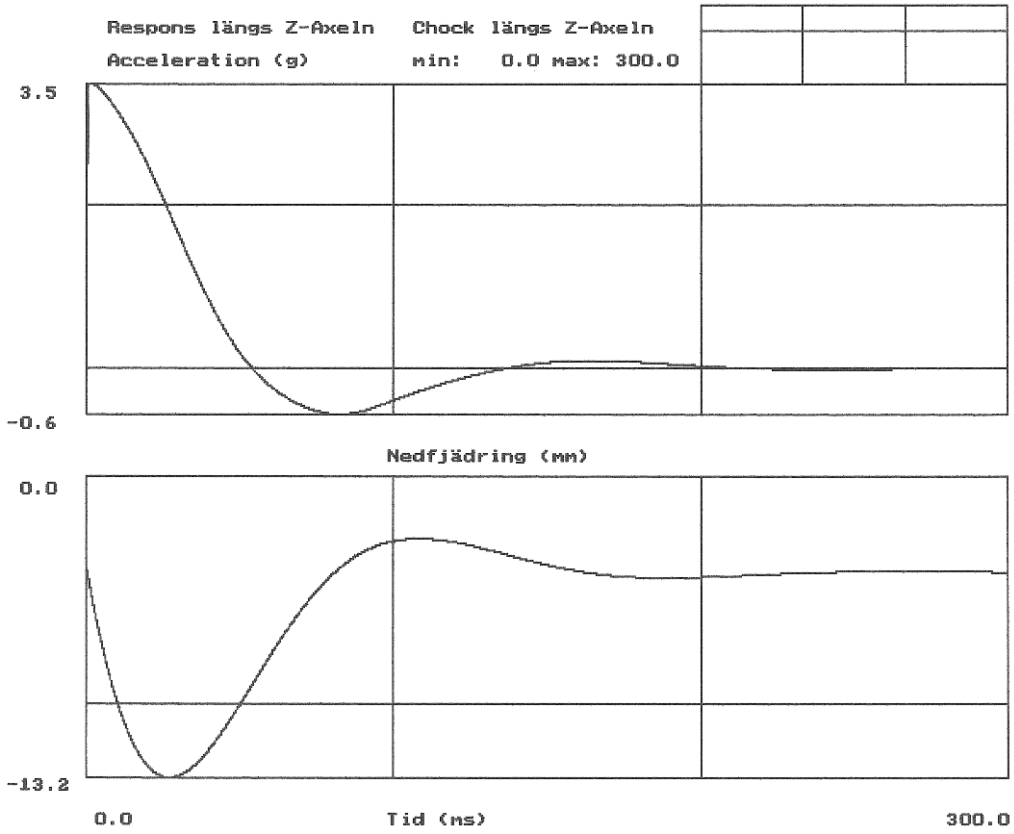
Vibrations – summary of test-report

- As the horizontal stiffness of the straps is unknown, this simulation is focused on the vertical axis of the suspension. The system natural frequency for this axis (Z) is shown on the graph below and indicated to be approximately 10.5 Hz. Vibrations higher than approximately 15 Hz should therefore be isolated; the higher vibration frequency the more effective is the degree of isolation.



Shock – extraction from test report

- The upper graph predicts a **residual shock of 3,5g at a 300g input** half-sine shock with a pulse duration of 0.5 msec (500 µsec.). The dynamic travel is predicted to be 15.5 mm (actually 11 mm + the static deflection of 4 mm). Due to the high inherent damping for cable mounts, the time before the mounts are back in neutral position is very short, as indicated on the lower graph (less than 300 msec.).
- The simulation predicts a **residual shock of 3,9 g at a 440g input**, half sine shock with pulse duration 0,31 msec.



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Shock and vibration damped stretcher rack

- With preinstalled anchoring points; the system can be operational, and three patients loaded, within 2 minutes from scramble. No tooling needed.
- Reducing vibration and shock to a pleasant/ acceptable level.
- Can easily be modified for other vessels, vehicles and AC.

NT-620 installed in Norwegian Battle boats

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Vibration and shock damped litter/table support, NT 630

- Reduces shock and vibrations in all directions (spherical dampening).
- Based on NT-620 patent.
- To be used when full access to patient is crucial or when a web strap solution is not achievable.

NT-630 installed in Norwegian Battle boat.

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CASEVAC

Multi role vehicles and vessels

- Enabling troop/cargo transport vehicles and vessels to be converted into Medevac/Casevac units in matter of minutes.
- Decreasing response time and increasing capacity.
- Acknowledging the “Golden Hour”.
  (Getting treatment within one hour after a serious wound/trauma increases the survivability significantly)

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Most countries experiences

- Limited First response capacity – need to wait for ambulances
- Limited ambulance capacity if multiple casualties at same time
- Limited catastrophe preparedness related to evacuation of large number of casualties.

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