

Indian defence lab develops ‘combat drugs’ to reduce casualties in Pulwama type attacks, warfare

The new medicines will ensure that the soldiers do not suffer from unwanted blood loss while being taken to better healthcare from war zones

New Delhi: With 90% of gravely wounded security personnel succumbing to injuries within a few hours, DRDO’s medical laboratory has come up with a range of ‘combat casualty drugs’ that can extend the golden hour till the trooper is shifted to hospital. The spectrum includes bleeding wound sealants, super absorptive dressings, and glycerated salines, all of which can save lives in the event of warfare in a jungle and high altitude areas as well as in terror attacks, scientists said.

Citing the February 14 terror attack in Pulwama where 40 CRPF soldiers were killed, they said the medicines could have brought down the death toll.

According to the developers of the drugs at the Institute of Nuclear Medicine and Allied Sciences(INMAS), a laboratory of the Defence Research and Development Organisation, chances of survival and minimum disability are highest when effective first aid care is given within the golden hour.

Scientists at INMAS, entrusted with research and development in a number of areas concerning the defence sector, said the main battlefield emergencies are excess bleeding, sepsis, shock, hypovolemia (decreased blood volume) and pain. DRDO’s indigenously made medicines will be a boon for paramilitary and defence personnel during warfare, said A.K. Singh, Director General of life sciences at the organisation. These medicines will ensure that our brave soldiers do not suffer from unwanted blood loss while being taken to better healthcare from war zones, he told *PTI*.

The challenges are many. There is only one medical person and limited equipment to take care of soldiers during combat in most cases. This is compounded by battlefield conditions such as forests, hilly terrain, and inaccessibility of vehicles, experts said.

Special medicated dressing material

Among the drugs developed is glycerated saline, a battlefield intravenous fluid that does not freeze till -18 degrees Celsius and is useful in handling trauma cases in high altitude areas.

According to Manju Bala Popli, senior scientist at INMAS, glycerated saline, unlike normal saline, reduces inflammation. The drug can be life-saving, particularly if the traumatic edema(the collection of fluid in tissues and cavities of the body) is in the brain or lungs. Glycerated saline has life-saving capacities as it gives more time to the medical personnel to shift the wounded patient to a higher care facility, Popli said.

INMAS has also developed a special medicated dressing material which is 200 times more absorptive than normal dressings during bleeding wounds.

Amit Tyagi, another senior scientist at INMAS and part of the team behind developing the drug, said the cellulose fibre-based dressings are more effective in stopping bleeding and keeping the wound clean. Additionally, antiseptics, antibiotics and curcumin can be impregnated in the dressing which acts as a slow drug release system, said a note prepared by INMAS on the medicines developed by it.

Normal cotton dressing used for bleeding wounds has sub optimal absorptive capacity and is soiled after sometime. In heavily bleeding wounds, putting a normal dressing can actually enhance the bleeding by sucking out the blood,” said INMAS scientist Gaurav Mittal. “It is safer and more effective to put in a long stuffed absorptive strip rather than individual gauge pieces. It has four-five times higher capacity to absorb blood.”

Chitosan gel

They have also developed a chitosan gel which helps in preventing blood loss by forming a film over the wound. Coupled with platelets and red blood cells aggregation, it stops the bleeding. Its antibacterial and wound health properties are of added benefit.

Chitosan gel is suitable for sealing wounds by twin action: haemostasis by chemical action and filing action. It can be used for wounds on the limbs and also cavities such as abdomen and thorax, INMAS Director Tarun Sekhri told *PTI*. The gel is poured onto the wound and held with physical pressure for few minutes till the bleeding stops, he said. It is topped by Chitosan wound cover. If the wound is deep, filters like silk and cellulose granules may be used after Chitosan gel, he explained.

The products developed for jungle warfare are at the stage of implementation, said Aseem Bhatnagar, additional director of the institute. "The Ministry of Home Affairs has recommended the cost-effective drugs to be inducted into their paramilitary forces while efforts are on with other forces for induction," he said.

Hypochlorous acid disinfectant

Part of the range is hypochlorous acid (HOCL), a disinfectant for troopers involved in jungle warfare. It is helpful in treating necrotising fasciitis, a rapidly progressing bacterial infection of soft tissues. Bacterial toxins cause local tissue damage and necrosis, as well as blunt immune system responses. In such cases, pure 0.01% HOCL which has broad-spectrum antimicrobial activity can rapidly neutralise bacterial toxins.

Bhatnagar said jungle warfare wounds have significant infection risk. The standard approach is to treat them with antibiotics. However, overuse and misuse of antibiotics often leads to breeding resistant strains of superbugs. A safe and effective alternative method for managing infected wounds is by using a more non-traditional cleansing agent. While the use of HOCL does not obviate the need for antibiotic, it augments treatment and speed of wounds healing. Undesirable side effects and antibiotics resistance gets reduced, Bhatnagar said.

INMAS scientists have also discovered a new route for administering the Nalbuphine injection to reduce pain during mutilating war injuries. The scientists have discovered that 10 mg injection of Nalbuphine hydrochloride is more effective for an injured trooper if it is given through the submental/sublingual route instead of intra-muscular or intravenous route.

<https://www.thehindu.com/news/national/indian-defence-lab-develops-combat-drugs-to-reduce-casualties-in-pulwama-type-attacks-warfare/article26495523.ece>

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DRDO develops 'combat drugs' to reduce casualties in Pulwama type attacks, warfare

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<https://economictimes.indiatimes.com/news/defence/drdo-develops-combat-drugs-to-reduce-casualties-in-pulwama-type-attacks-warfare/printarticle/68355146.cms>



Tue, 12 Mar 2019

Let them take flight: on Tejas and Kaveri projects

It is not late to declare the Tejas and Kaveri projects as ‘national missions’

By Arun Prakash

At the Aero-India 2019 airshow and aviation exhibition, held in Bengaluru last month, there were two developments of significance, for India’s national security as well its moribund aeronautical industry. On February 20, the Indian Air Force and the aviation community heaved a collective sigh of relief after the Light Combat Aircraft (LCA) Tejas Mark 1, received its long-awaited Final Operational Clearance; this means it is combat-ready and can be exploited to the limits of its approved ‘envelope’. However, a day later, came a rather unwelcome report: a Defence Research and Development Organisation (DRDO) announcement at the show of its decision to shelve the Kaveri turbo-jet engine project. While one waits for this report to be confirmed or denied, given the criticality of this engine for India’s aeronautical industry, the issue deserves a close look.

Political myopia

Historically, all major aerospace powers have possessed the capability to design airframes as well as power-plants. Until India can design and produce its own aero-engines, the performance and capabilities of any indigenously designed/built aircraft will be seriously limited by the technology that we are permitted to import. India has already had two bitter experiences in this regard. The Hindustan Aeronautics Limited’s sleek and elegant HF-24 Marut fighter, of the 1960s and 1970s, failed to achieve its huge potential as a supersonic fighter for want of a suitable engine. Rather than exert itself to seek alternatives, the government of the day, with stunning myopia, closed the programme.

Similarly, many of the problems the Tejas faced emanate from lack of engine thrust. Even as the Kaveri has failed to make an appearance, U.S.-made alternatives such as the General Electric F-404 engine, or even the more powerful F-414, do not deliver adequate thrust for the Tejas Mk 1, to meet all its missions. For the Tejas Mk IA, Mk II, the LCA Navy, and other aircraft programmes such as the Advanced Medium Combat Aircraft, India will need turbo-jet engines of even greater thrust. Thus, it is vital for India to develop a family of homegrown jet engines to power indigenous combat aircraft as well as re-engine imported ones.

A pivotal role

In this context, it is necessary to recognise that both the Tejas and Kaveri projects — which have seen more than their share of headwinds and uncertainty — form key components of India's technological aspirations. Unless carefully guided, protected and nurtured, their failure could spell the end of India's aeronautical industry, or condemn it forever to licensed production. A long production run of, say, 250-300 aircraft for the Tejas and its advanced derivatives is essential if the industry is to hone its design and production skills.

The same holds good for the Kaveri, except that the design and production of a functional turbojet engine are even more challenging. The HAL claims to have “manufactured” nearly 5,000 aero-engines of British, French and Russian design, and overhauled 18,000 of them. Since this putative “manufacturing” process involves merely the assembly of imported components, several engine divisions of the HAL have failed to imbibe aspects of design, metallurgy, thermodynamic and aerodynamic engineering as well as the complex tooling and machining process required for the design and manufacture of aero-engines, over the past 60 years — a sad commentary. In 1986, the DRDO's decades-old Gas Turbine Research Establishment (GTRE) was tasked with developing an indigenous power plant for the LCA, which was to replace the U.S. engines being used for the development phase of the aircraft.

Having developed two experimental engines, the GTRE took up a turbofan design, designated the GTX-35VS “Kaveri”, for the LCA. Full-scale development was authorised in 1989 for 17 prototypes at a cost of \$55 million. The first complete prototype Kaveri began tests in 1996, and by 2004 it had flown on a Russian flying test-bed; albeit unsuccessfully. Since then, the Kaveri has made sporadic progress and the GTRE has been struggling with serious design and performance issues which it has been unable to resolve. As the Kaveri missed successive deadlines, the U.S. import option was mindlessly and gleefully resorted to.

A series of troughs

Given the DRDO's penchant for secrecy and misplaced optimism, the true story of the Kaveri's halting progress has never been revealed to Parliament or the taxpayer. However, two details, available on the Internet, are revelatory of the organisation's ‘modus operandi’. It has, at least, on two occasions, approached French and British aero-engine manufacturers for advice and consultancy in operationalising the Kaveri. Despite reportedly attractive offers of performance-enhancement and technology-transfer, the negotiations stalled reportedly on cost considerations. It is also interesting to note that in 2014, this project — of national importance — was arbitrarily shut down by the DRDO only to be revived subsequently for reasons unknown.

It is obvious that the onus for repeated setbacks in these projects must lie squarely on India's political leadership; for its neglect as well as absence of a vision for the aeronautical industry. There are three more factors: over-estimation by the DRDO of its capabilities compounded by a reluctance to seek advice; inadequate project management and decision-making skills of its scientists; and exclusion of users — the military — from all aspects of the projects.

It is still not too late for the government to declare both these projects as ‘national missions’ and initiate urgent remedial actions. The success of both the Kaveri and Tejas programmes will transform the aerospace scene, and put India in the front ranks of aeronautical nations, perhaps even ahead of

China, if the desired degree of resolve and professional rigour can be brought to the fore. If we miss this opportunity, we will remain abjectly import-dependent forever in this vital area.

(Admiral Arun Prakash retired as India's 20th Naval Chief and Chairman Chiefs of Staff in 2006)

<https://www.thehindu.com/opinion/op-ed/let-them-take-flight/article26502547.ece>

TIMESNOWNEWS.COM

Tue, 12 Mar 2019

India successfully tests two Pinaka guided extended-range rockets

The indigenously-developed guided Pinaka by DRDO will significantly boost the capability of the artillery to make precision hits

New Delhi: The Defence Research and Defence Organisation (DRDO), India's central agency responsible for military research and development, successfully tested two Pinaka guided extended range rockets from Pokhran ranges on Monday.

The weapon system is equipped with state-of-the-art guidance kit comprising of an advanced navigation and control system. In both the missions, the weapon systems impacted the intended targets with high precision and achieved desired accuracies, the Indian government said in a statement.

Telemetry Systems tracked and monitored the vehicle all through the flight path. All the mission objectives have been met. The indigenously-developed Guided Pinaka by DRDO will significantly boost the capability of the artillery to make precision hits.

The multi-barrel rocket system Pinaka is an area weapon system to supplement the existing artillery gun at ranges beyond 30 kilometres, having quick reaction time and high rate of fire, the DRDO website says.

<https://www.timesnownews.com/india/article/pinaka-rocket-test-fire-guided-extended-range-launcher-india-successfully-tests-off-odisha-coast-indian-army/380522>

dailyhunt

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Twin tests of Pinaka guided rockets carried out successfully: DRDO

Pokhran: Pinaka extended range rockets, developed by Indian Army and Defence Research and Development Organisation (DRDO), were fired from Pokhran ranges today.

Two rockets fired from a multi barrel launcher hit their targets successfully, sources said.

"Defence Research and Defence Organisation (DRDO) today successfully test fired the Guided PINAKA from Pokhran ranges. The weapon system is equipped with state-of-the-art guidance kit comprising of an advanced navigation and control system. In both the missions, the weapon systems impacted the intended targets with high precision and achieved desired accuracies. Telemetry Systems tracked and monitored the vehicle all through the flight path. All the mission objectives have been met," DRDO said in a release.

The indigenously developed Guided Pinaka by DRDO will significantly boost the capability of the artillery to make precision hits, it added.

Last year, several tests of non-guided version of Pinaka rockets were test fired successfully, prompting for upgraded version of the rocket. The first successful test flight was conducted in January, 2017.

Worth mentioning, the guided Pinaka has been developed jointly by the Armament Research and Development Establishment (ARDE), Pune, the RCI, and the Defence Research and Development Laboratory (DRDL), Hyderabad, for the Indian Army.

<https://m.dailyhunt.in/news/india/english/odisha+sun+times-epaper-osuntime/twin+tests+of+pinaka+guided+rockets+carried+out+successfully+drdo-newsid-110882003>

अमर उजाला

Tue, 12 Mar 2019

भारत ने किया लंबी मारक क्षमता वाले दो रॉकेट का सफल परीक्षण

पोखरण: राजस्थान में पोखरण मरु क्षेत्र से स्वदेश विकसित गाइडेड रॉकेट प्रणाली पिनाका का सोमवार को सफल परीक्षण किया गया। इससे सेना की क्षमताओं को मजबूती मिलेगी। यह हथियार प्रणाली अत्याधुनिक मार्गदर्शन किट से सुसज्जित है जिसमें एक उन्नत नेविगेशन और नियंत्रण प्रणाली शामिल है।

रक्षा मंत्रालय ने कहा, 'डीआरडीओ द्वारा स्वदेश विकसित पिनाका, सटीक निशाना साधने के लिये शस्त्र भंडार की क्षमता को उल्लेखनीय रूप से बढ़ाएगा।' परीक्षण के बारे में यह कहा गया कि हथियार प्रणाली ने तय लक्ष्यों पर काफी सटीक निशाना लगाया और वांछित सटीकता हासिल की। मंत्रालय ने कहा, 'टेलीमेट्री सिस्टम ने उड़ान पथ के दौरान वाहन पर नजर रखी और उसकी निगरानी की। मिशन के सभी उद्देश्य पूरे हुए हैं।'