



CATALYTIC • DOW

APOLLO 11

PRESS KIT



A JOINT VENTURE

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NEWS

July 7, 1969

RELEASE: IMMEDIATELY

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LAUNCH PAD WATER DELUGE SYSTEM TO PROTECT PAD FROM SATURN V HEAT DAMAGE DURING APOLLO 11

Eight seconds before launch of the Apollo 11 mission to the moon, five mainstage F-1 booster engines of the giant Saturn V rocket will ignite. During the next eleven seconds before lift-off from launch pad 39A, and for approximately 15 seconds more until the Saturn V has cleared the top of the mobile launcher, a huge burst of flame hotter than a blast furnace will be hurled against nearly every exposed part of the Mobile Launcher structure and the flame trench area. Because of pressure and atmospheric differentials, there is no accurate estimate of the maximum heat generated by the five mainstage engines. Nevertheless, the heat and blast pressure generated by flames from these engines is sufficient to turn steel into molten, twisted shapes.

To protect these expensive launch facilities, NASA and one of the Space agency's prime support contractors, Catalytic-Dow, have devised a Water Deluge System which blankets the entire pad surface area and all exposed structural members of the Mobile Launcher with tons of water during the entire lift-off sequence.

Water from this system is supplied at rates up to 50,000 gallons per minute. The system has the capability to supply one million gallons of industrial water for cooling and fire prevention for each Apollo launch. The system, a maze of huge pumps and piping leading to various levels of the mobile launcher structure, the deck of the

Mobile Launcher, and down in the flame trench area beneath the pad deck, pours water onto surfaces which are exposed to flames from the Saturn V's first stage engines.

The system is activated from the launch control center 1 minute before launch and continues to cool the tower and flame trench area for a full 5 minutes after launch. During the six-minute period, the water deluge system normally uses about 350,000 gallons of water (it takes a city of 40,000 population about two hours to use up this much water).

The activation sequence for the Water Deluge System begins approximately 60 seconds before ignition when the flame deflector in the flame trench beneath the Saturn V rocket is deluged with 15,000 gallons of water per minute from 6 nozzles located along the walls of the flame trench. As lift-off occurs, the deck of the Mobile Launcher is deluged with 25,000 gallons of water in 30 seconds. This is followed by activation of the flush subsystem at various levels of the Mobile Launcher, producing a total of 25,000 gallons per minute for a 5-minute time period.

Without the use of this water system, a good portion of the launch pad area together with the Mobile Launcher would be critically damaged by the heat and blast generated by each Saturn V launch. Even with the full employment of the Water Deluge System, a complete refurbishment program is necessary on each Mobile Launcher and pad area following each Saturn V launch.

Catalytic-Dow has been responsible for the Water Deluge System and the improvement of its capability and reliability during each of the Saturn V launches in the Apollo program. Catalytic-Dow, located in Titusville, Florida and at Kennedy Space Center, provides strong design engineering and construction support as a member of the NASA Apollo team. The firm is a joint venture of the Catalytic Construction Company of Philadelphia, Pennsylvania, and the Dow Chemical Company of Midland, Michigan.



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THE RIDE NO ONE WANTS TO HAVE TO TAKE

On the northwest corner of the 320-foot level of the Mobile Launcher at Launch Complex 39A, a tubular aluminum structure hangs in suspended animation, attached to the Mobile Launcher by dual release pins. Two trolley wheels on its roof sit firmly on a stainless steel cable which slopes away to the west of the Mobile Launcher to a point 2000 feet away at ground level. Three rows of foam rubber seats fill the interior of the structure--all the room needed for three astronauts and six members of the close-out crew of Apollo XI. The Cab, as it is called, stands ready for a speedy ride down the length of the cable, but it is a ride that no one wants to have to take.

The Cab is part of the slide wire emergency egress system for Launch Pad 39A. The system was designed and built by Catalytic-Dow, one of the prime NASA support contractors at Kennedy Space Center.

During the final phases of the countdown for Apollo XI, only the three astronauts and six members of the close-out crew will be at the 320-foot level of the Mobile Launcher. In the event that any situation might arise which would dictate immediate egress from the area, these nine men would race around a cat-walk leading from Swing Arm 9 and the Command Module. As they approached the main deck of the 320-foot level, they would have a choice of egress modes. To their left would be stationed a high-speed elevator which would carry them to a level just below the Mobile Launcher deck in approximately one minute. There, they could dive into a teflon-lined chute which would carry them to a subterranean blast room and safety.

However, if the situation dictated an even faster method of egress, all nine men could enter the cab, and within seconds would begin a 75 mile-per-hour trip down the slide wire to a waiting bunker in the landing area 2000 feet from the base of the Mobile Launcher. The trip takes approximately 35 seconds from the release of the cab from the Mobile Launcher to a complete stop in the landing zone.

The development of the slide wire system in its final configuration is an example of the quick response capability of Catalytic-Dow in meeting the rapid changes required by the Apollo program. Following the Apollo VIII launch on December 21, 1968, Catalytic-Dow, working closely with KSC Design Engineering, began a detailed analysis and design of this system. Actual testing of this system began on December 24th and within 31 days, the system had been completely redesigned to meet NASA's specifications, all hardware procured, the cab fabricated, and testing completed. Thus, the cab was ready to support the Apollo IX launch in March of this year.



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CATALYTIC-DOW'S EXPERTS TO MONITOR LAUNCH SUPPORT SYSTEMS FOR APOLLO 11

During the countdown for the Apollo 11 launch, key Catalytic-Dow engineers will be stationed in the firing room at Kennedy Space Center. Acting as advisors, these men are prepared to instantaneously assess the impact and probable results of malfunctions in any of the Apollo 11 launch support systems for which Catalytic-Dow is responsible. In the event of a malfunction, these men advise Launch Control of the impact of the particular problem and what must be done to correct the malfunction.

These Catalytic-Dow experts (Allen D. Reeder, Raymond R. Welsh, Lawrence A. Vabulas, and John R. Hilding) will be stationed in the firing room of the Launch Control Complex on launch day. They will be responsible for monitoring the Water Deluge System; the Gaseous Nitrogen Hazard Proofing System; and the Heating, Ventilating and Airconditioning Systems for the launch pad and Apollo launch support facilities at the space center.

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WHAT DOES CATALYTIC-DOW DO IN THE SPACE PROGRAM?

Catalytic-Dow, one of the prime contractors on the Government-Industry Launch Team at Kennedy Space Center, by providing NASA with engineering and construction talent and know-how, has helped ready the launch facilities at Kennedy Space Center for Apollo 11. The NASA contractor is a Joint Venture between the Catalytic Construction Company and The Dow Chemical Company. Catalytic-Dow (locally known as "Cat-Dow") employs approximately 500 engineering and construction personnel both at its headquarters in Titusville and at Kennedy Space Center.

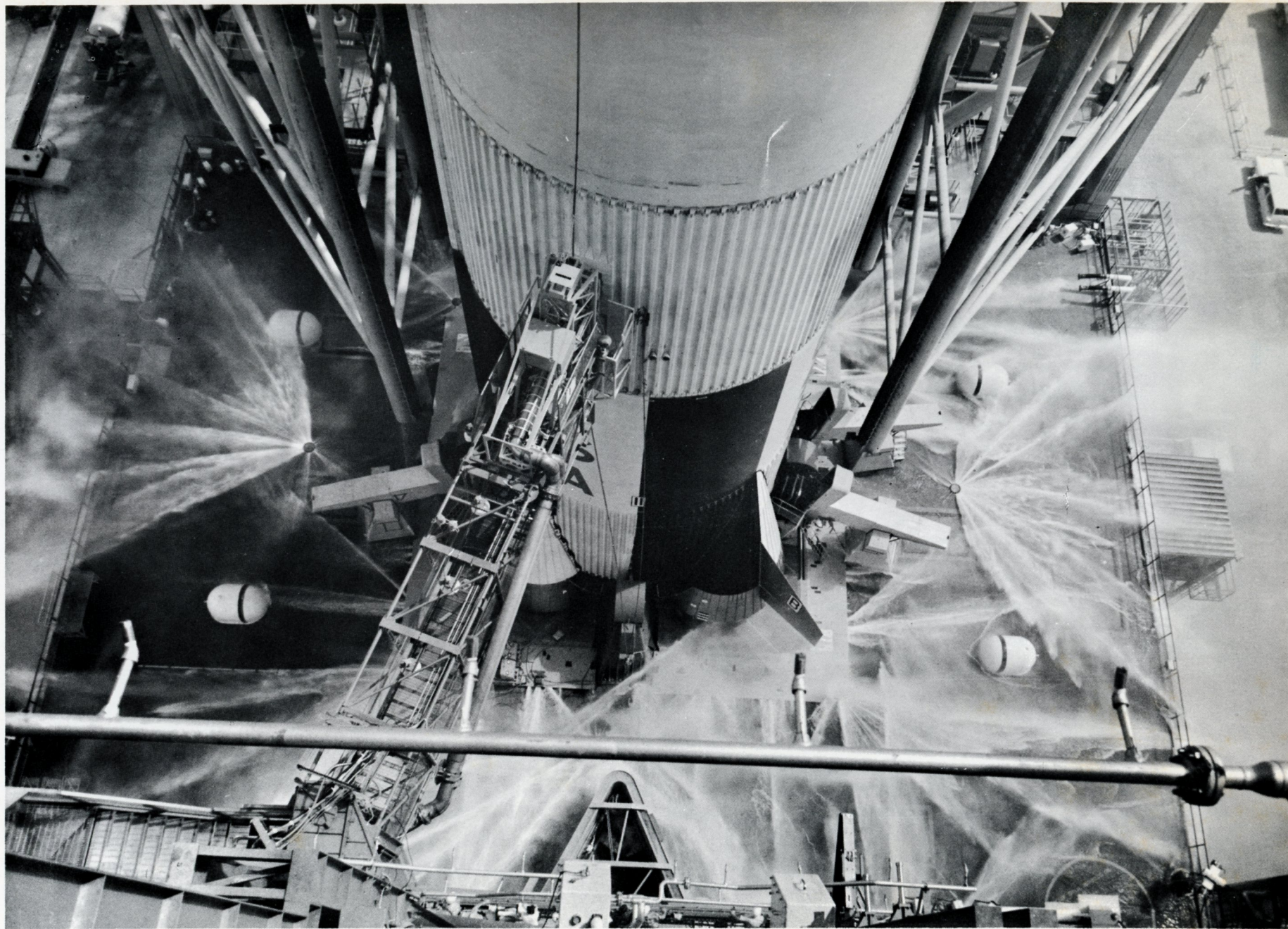
The firm's engineering and construction work covers a wide variety of engineering and construction assignments on launch support systems at KSC. Over the last two years, Catalytic-Dow's work has included:

- Design and installation of freon fire suppression and prevention systems for the Apollo spacecraft altitude chambers and for the service module - lunar module adaptor area around the Saturn V rocket.
- Design and development (with NASA Design Engineering at KSC) of the Slide Wire-Cab Egress System (which permits evacuation from the launch pad in the event of an emergency prior to launch), then fabrication, installation, and testing of the system for use in Apollo launches.
- Extensive design and modification work on launch pad systems such as the Water Deluge System, the HVAC (Heating, Ventilating, and Airconditioning) Systems, and the Gaseous Nitrogen Hazard Proofing System.
- Construction forces and engineers for Cat-Dow have completed both small and large design, repair, and modification jobs at KSC. In total, over a thousand separate modification jobs, identifiable with the Apollo program, have been completed.

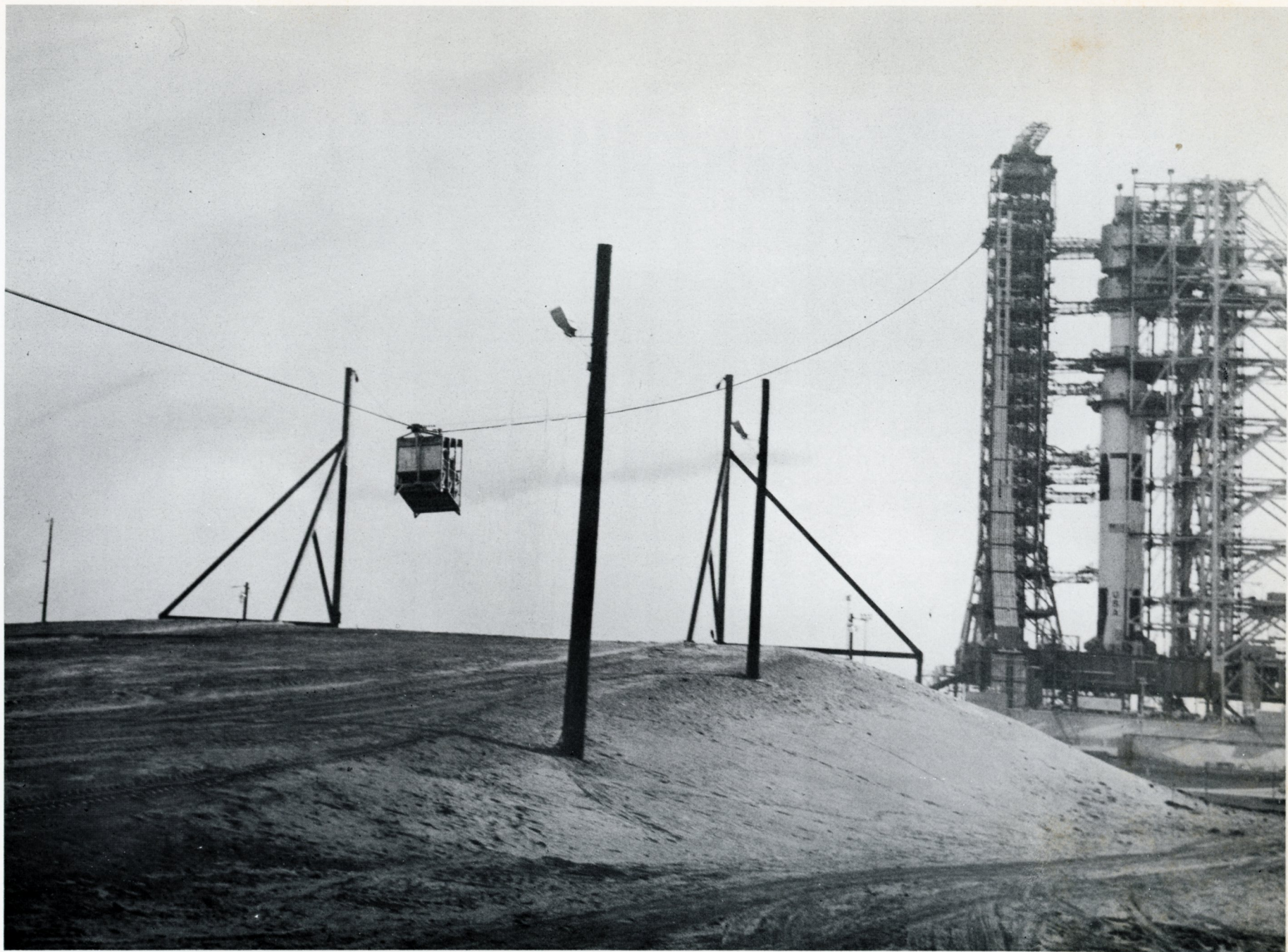
Although the Catalytic-Dow Joint Venture was formed in 1967, both Catalytic and Dow have been involved in the space program almost since its inception:

- Catalytic Construction Company, in the beginning of the construction phase at Kennedy Space Center, was responsible for the construction and installation of Launch Complex 39 propellant handling systems at KSC. Catalytic also assisted the Corps of Engineers at KSC by coordinating major installation work and by providing the Corps of Engineers with construction planning and scheduling expertise. In addition, Catalytic has been deeply involved in the overall installation of the nuclear rocket development station at Jackass Flats, Nevada, completed several contracts at the Eastern Test Range, and has, for over a decade, helped design and install over 700 individual missile launch sites around the nation.
- The Dow Chemical Company, the other partner to the joint venture and the nation's fourth largest chemical firm, was also involved in the early stages of Kennedy Space Center engineering and construction activities. From 1964 until the formation of the joint venture in 1967, Dow Aerospace Services provided facilities engineering support services, assisting NASA in the overall planning of the Merritt Island launch area for the Apollo program. Dow propellant fuels for missiles and space vehicles, and its Dowell Division established the first aerospace chemical cleaning facility in Cape Canaveral in the early part of the 1960 decade. Dow's product lines have also contributed significantly to aerospace and the Apollo program. Dow engineers developed epoxy novolac which is the charring material used on the heat shield to withstand extreme temperatures.

In short, Catalytic and Dow have solid backgrounds and experience in the space program; the organization which resulted from their marriage in 1967 has made a significant contribution to the Apollo program.



WATER POURING OVER THE BASE OF THE MOBILE LAUNCHER AT KSC -- The F-1 boosters on the Saturn V rocket generate enough heat to melt unprotected metal surfaces on the launch pad. To cool these surfaces at lift-off, great quantities of water (50 thousand gallons per minute) are poured onto pad structures from a maze of piping and pumps called the Water Deluge System. This system was designed and installed for NASA by Catalytic-Dow (one of NASA's prime support contractors at KSC).



SLIDE WIRE - CAB EGRESS SYSTEM AT LAUNCH COMPLEX 39, KSC -- In the event of an emergency prior to launch, 3 astronauts plus 6 technicians can escape from the 320 foot level of the Mobile Launcher to a point approximately 2,000 feet from the center of the launch pad at ground level in a metal cab which traverses the 1-1/8" stainless steel cable in approximately 30 seconds (60-70 mph).