
Redesigning the **Identity** of the **Indian Military Jeep**

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07613005

Project 2, Jury Presentation
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Need for the Project

The Army has been using the **Mahindra Jeep** from the year **1945**, when the then Mahindra & Mahindra got the **license to manufacture** the CJ-3A and CJ-3B series of vehicles from **Willys USA**.

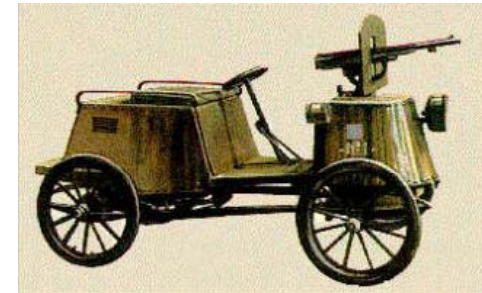
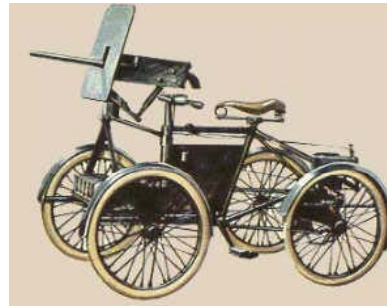
These vehicles are **manufactured even today** under the name of the MM-540 series. Another manufacturer, **Maruti Suzuki with the Gypsy** has kept an option alive for the army.

But these vehicles **have been around for ages** now the Jeep since 1945 (or 1972 when it was reborn) and the Gypsy since the early 1990's.

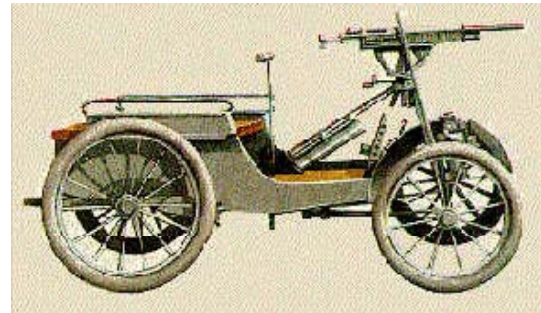
It's the year 2008 and the Indian army needs something new, something fresh!

Pre-Jeep era (1896 onwards)

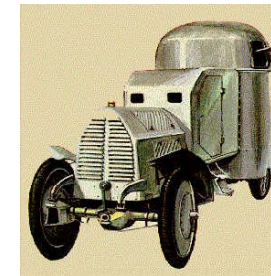
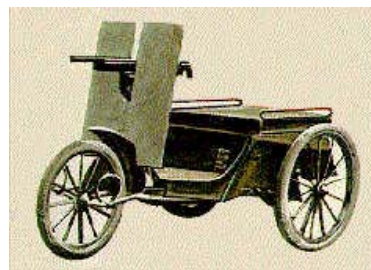
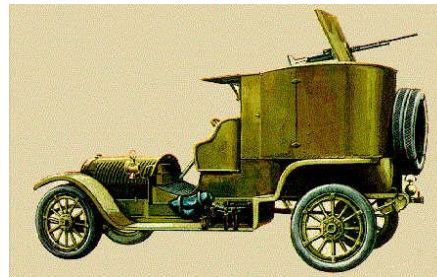
'Automitrailleuse' as these were known were the first known military vehicles to be ever used in the world.



Regular production vehicles then, simply fitted with a firearm and some shielding to act as protection.



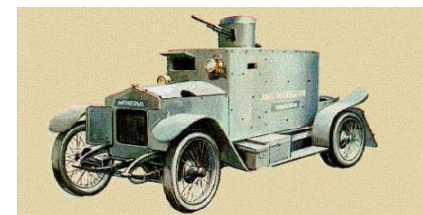
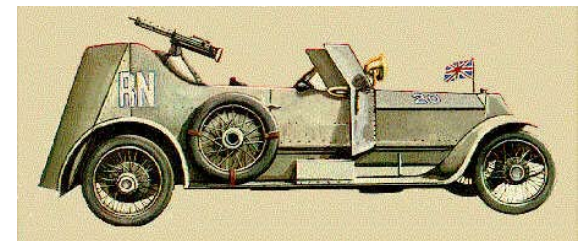
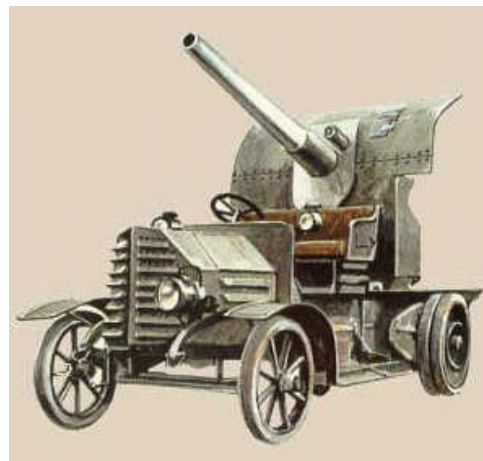
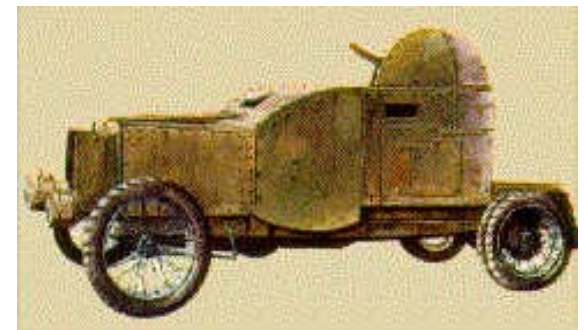
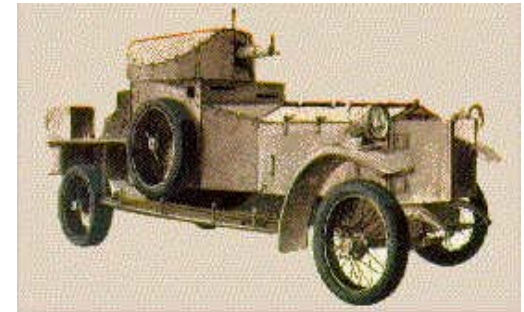
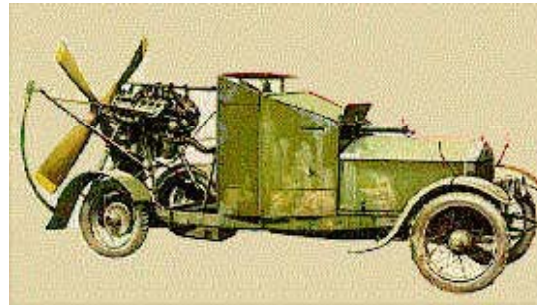
As the vehicles improved, so did the quality and the level of protection in the military vehicles.



Pre-Jeep era (1913 onwards)

This period comprised of huge developments in the automobile industry. With coachbuilders coming of age, their services were used for making armor protection and military or police vehicles were made.

A lot of regular automobile manufacturers took pride to present cars which could be used either in the military or used for police or riot control. Today's big names like Lancia, Peugeot, Renault, Rolls Royce are a few names.



How and Why was the Jeep conceived

The Army identified a requirement for a Light Reconnaissance Vehicle, small weapons carrier, and personnel transport that would replace automobiles and motorcycles with sidecars.

Among the characteristics the new vehicles were to have:

- Weight not to exceed 1300 pounds
- Carry 600 pounds of payload in cross country operations
- Wheelbase not to exceed 75 to 80 inches
- Height not to exceed 40 inches
- Ground clearance of 6.25 inches at minimum
- Mount for a .30 cal. machine gun
- Approach angle 45° and departure angle 40°
- Rectangular body and folding windshield
- Seating for 3 soldiers
- 4x4 drive with two speed transfer case, geared for up to 50 mph on-road and down to 3 mph off-road.

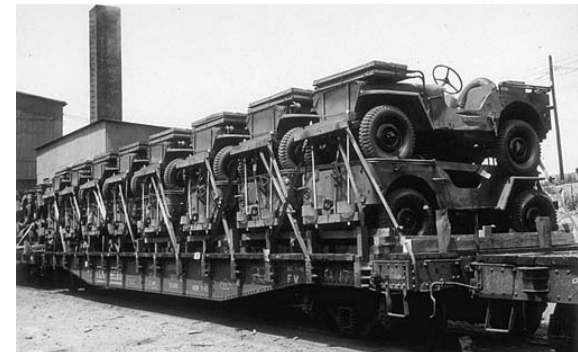
Initial Army Vehicles



The 1940 Bantam Pilot Or the Model Mk One Bantam quickly put up a team and came up with the first prototype. Bantam Reconnaissance Car Model-60 or BRC-60 Codenamed the Model Mk Two



Ford Pygmy, was introduced in November 1940.



Willys Quad, was introduced in November 1940.



The Final Model of the Ford GPW



Etymology of 'JEEP'

The name **JEEP** originated from:

- As a derivative of the Ford GP (for general purpose).
- From Eugene the Jeep, a character from the comic strip Popeye during 1936.
- JEEP is military slang for a new Recruit.
- From the name 'PEEP', from how the horn sounded.
- From publications of a certain Red Hausmann of Willys who reported with a photograph "Jeep Creeps Up Capitol Steps"

Progress over the years

The Willys brand finally became known as the Jeep[®] and has been owned by the Daimler-Chrysler company over quite a few mergers and take-over.



The last Jeep was the M-151 series, the last model was the M-151A2 Jeep. There weren't any civilian versions of this vehicle.

Considering the increasing requirements of the Military, the small Jeep was discarded and replaced by the HMMWV (High Mobility Multipurpose Wheeled Vehicle).

Progress over the years

M151
series



M -151A2
series



HMMWV



India pre-Jeep era

Known as the Rover Series One and built by the British company Land Rover.



Known as the Jonga, this was another option the army had other than the Land Rover.



How the Jeep came to India

- Mahindra & Mahindra (M&M) first started **making Jeeps under license** of Willys Corp. USA in the year 1949.
- These arrived as **CKD (Completely Knocked Down) kits** and were assembled here, with the **frame being primarily M&M's manufacturing** responsibility
- Slowly most of the components in the kit started being **sub-contracted, and indigenized**.
- Finally M&M started taking the same route as Willys USA and **started making civilian versions**.
- It wasn't **until 1985** when M&M launched its first vehicle, based on the Willys Jeep M151 series, known here as the MM-400DP
- The CJ500DI and the MM540DI are **still made**.

Jeeps used India



Military versions



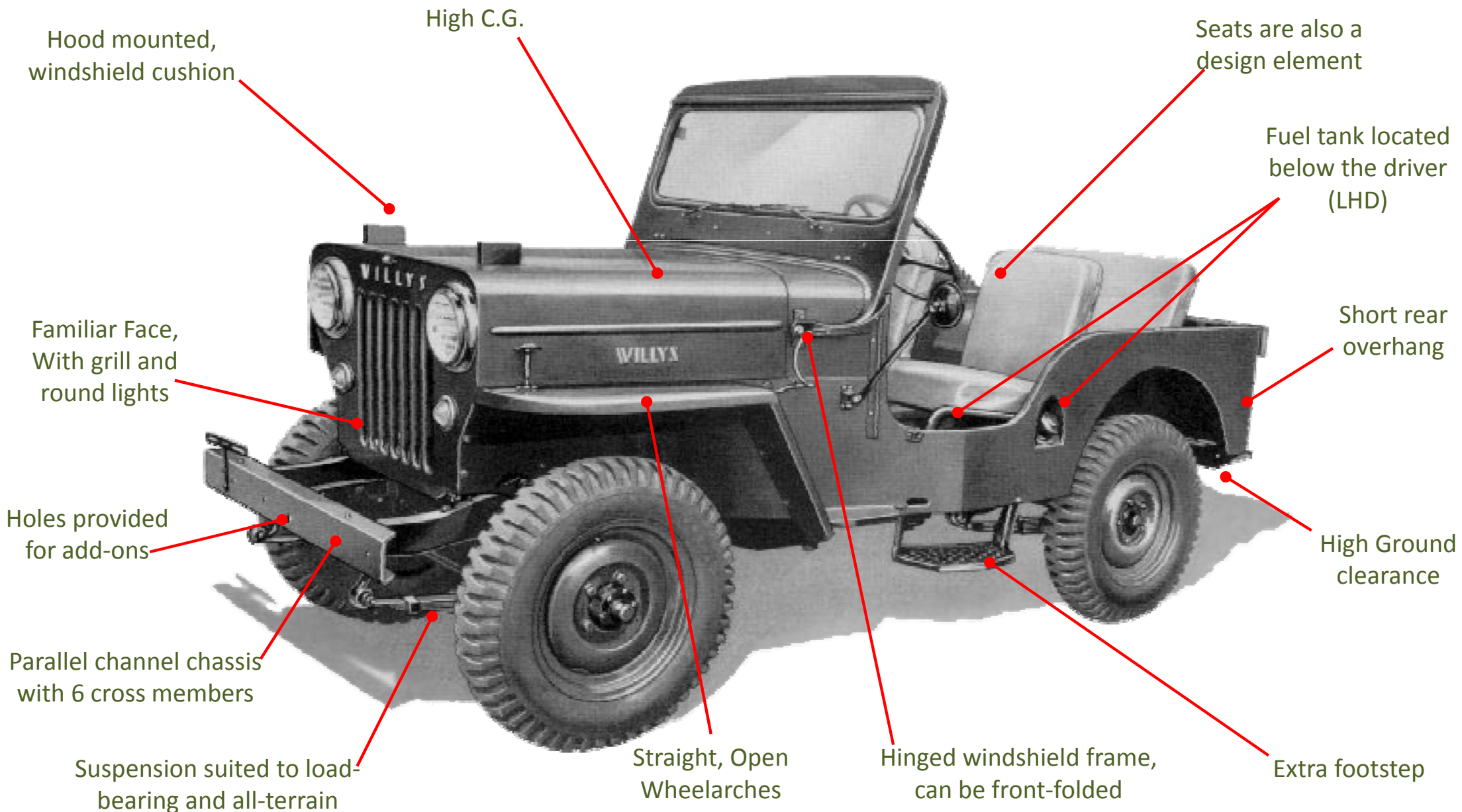
Civilian versions today

Mahindra CJ500DI



Jeep Mahindra MM540

Features that define an Indian Jeep



Features that define an Indian Jeep

Rear side fender
mounted spare wheel

Fold flat, rear seats

Fold down tail-gate

Blacked out
tail lights

Towing hook for
trailer hitching

High-Mounted
Exhaust pipe

Electric motor with manual
override for the windscreen wiper

Square hood

Minimum dials

Place on the body for
water container
mounting

Longer suspension travel to assist
driving during Off-road situations

Army replacements

Planned by Mahindra
Axe FAV



Planned by Tata LSV



Tata Land Rover Defender



Role played by the Military jeep in India

The Military Jeep in India is used for the following:

- Primary Reconnaissance.
- Tank-Hunting.
- Support Vehicle for another Heavier Specialist Vehicle. (Carrying Live Shells)
- Mobile Communication Centre for a Heavier/Fixed Installation and ground troops.
- To aid any kind of Material Handling inside or outside the Military Base.
- As a runabout for the Military Officials.
- Transport soldiers from their homes in civilian areas to their Military Base Camps and vice-versa.

Image Board



Image Board



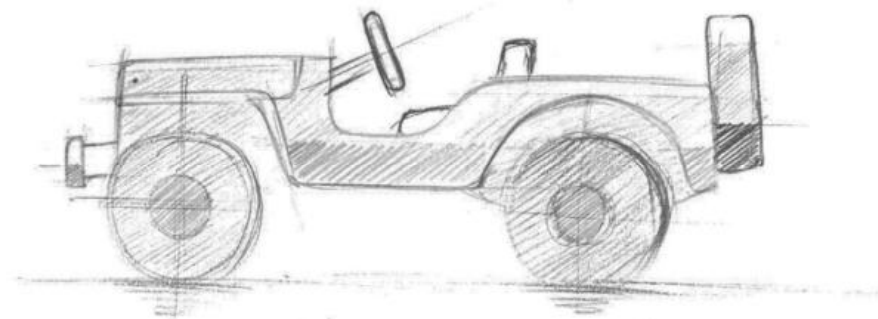
Metaphors and Understanding the Army

Agile, Alert, Camouflage, Solidity, Robust, Rugged, Tough

The jeeps used in the Indian Military are of two types:

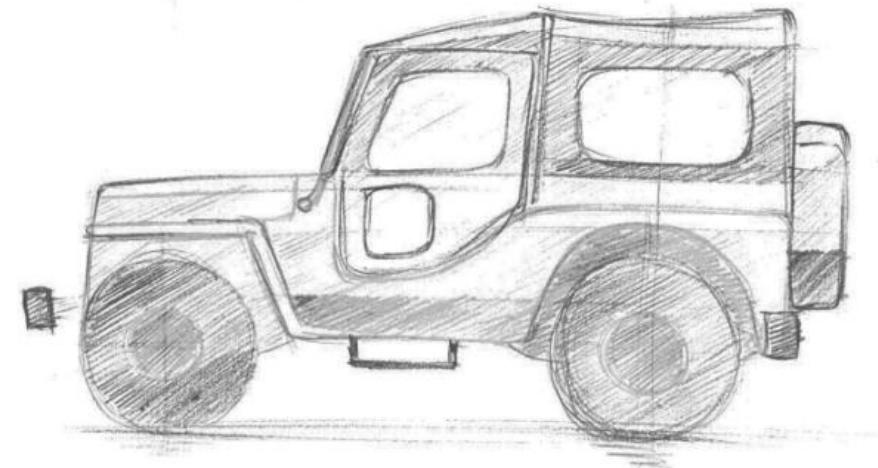
Frontline Jeeps

reconnaissance.

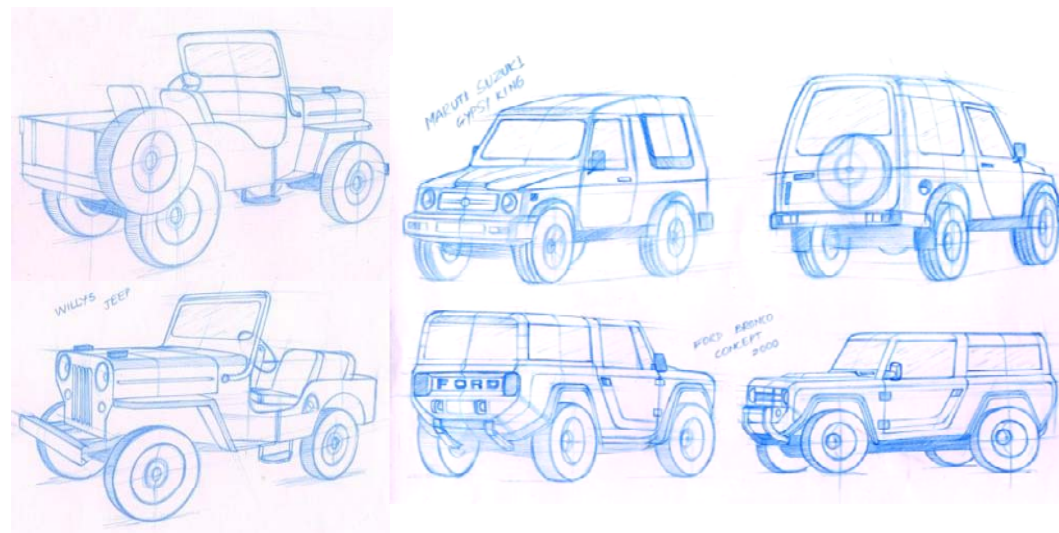
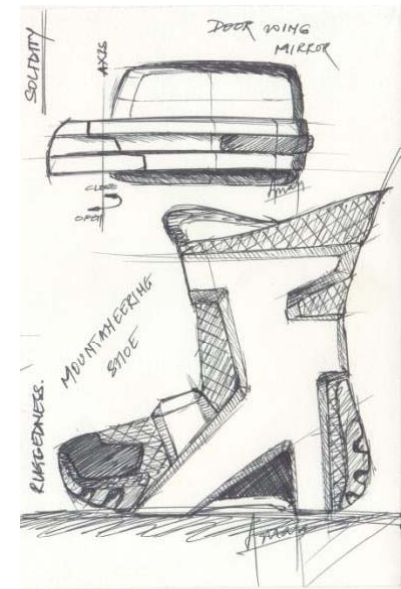
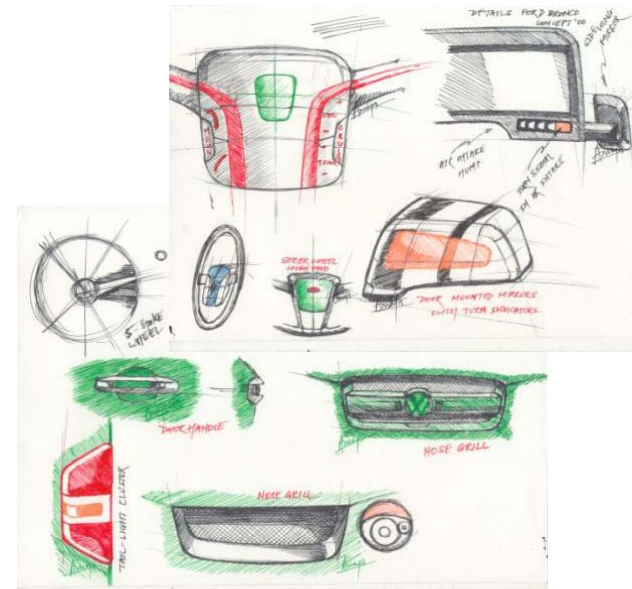
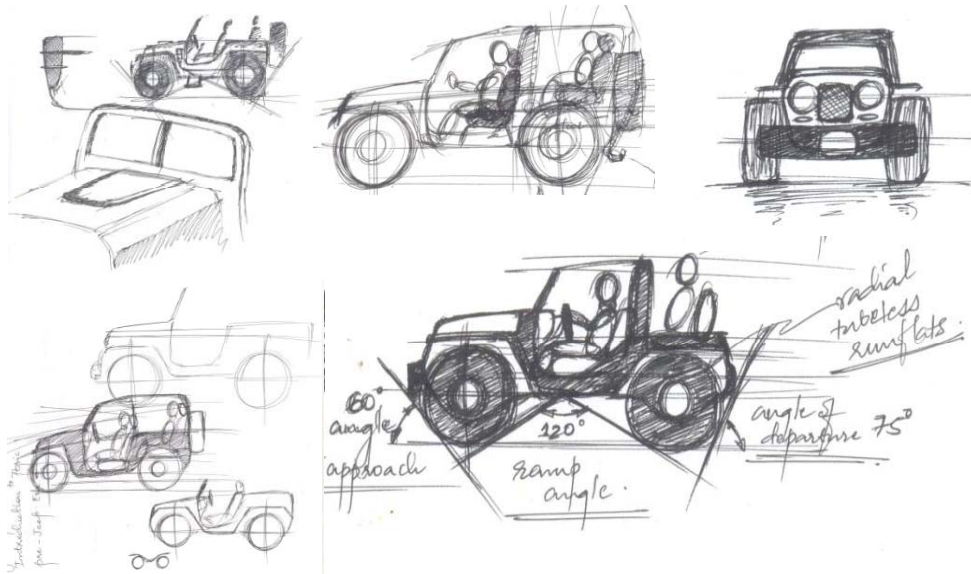


Passenger Jeeps

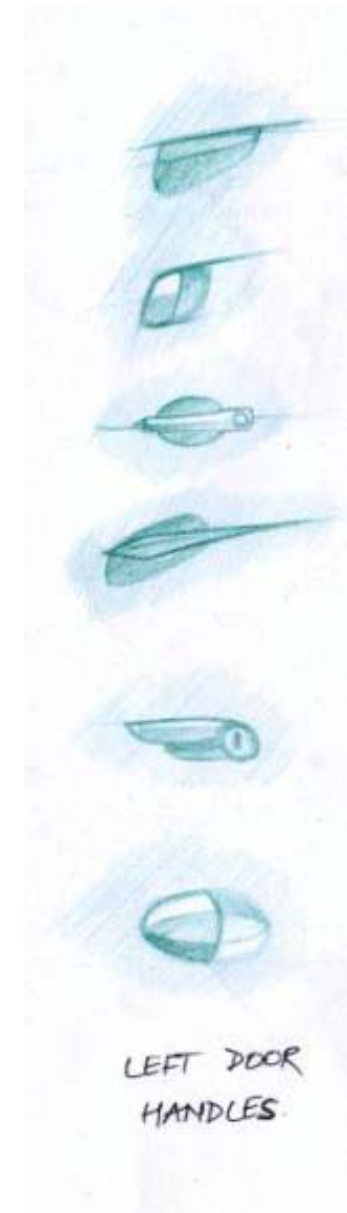
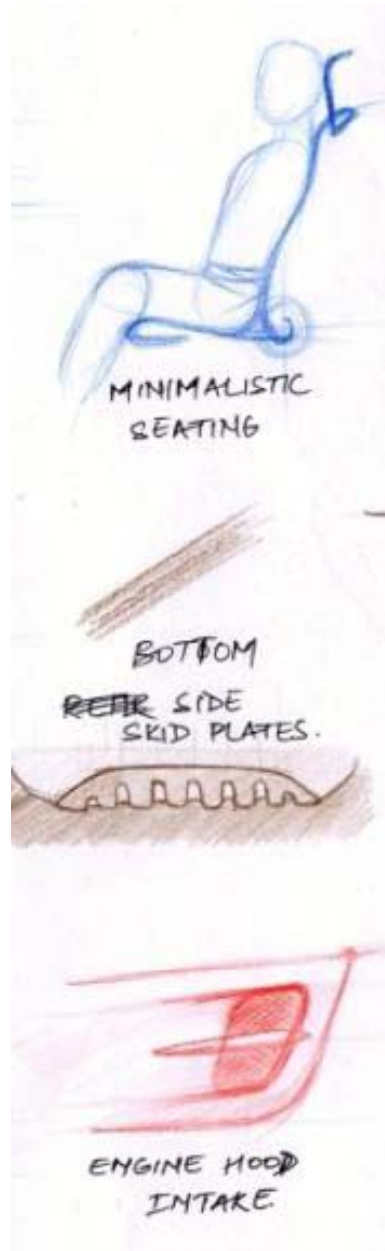
shuttle for army officials, base runabout



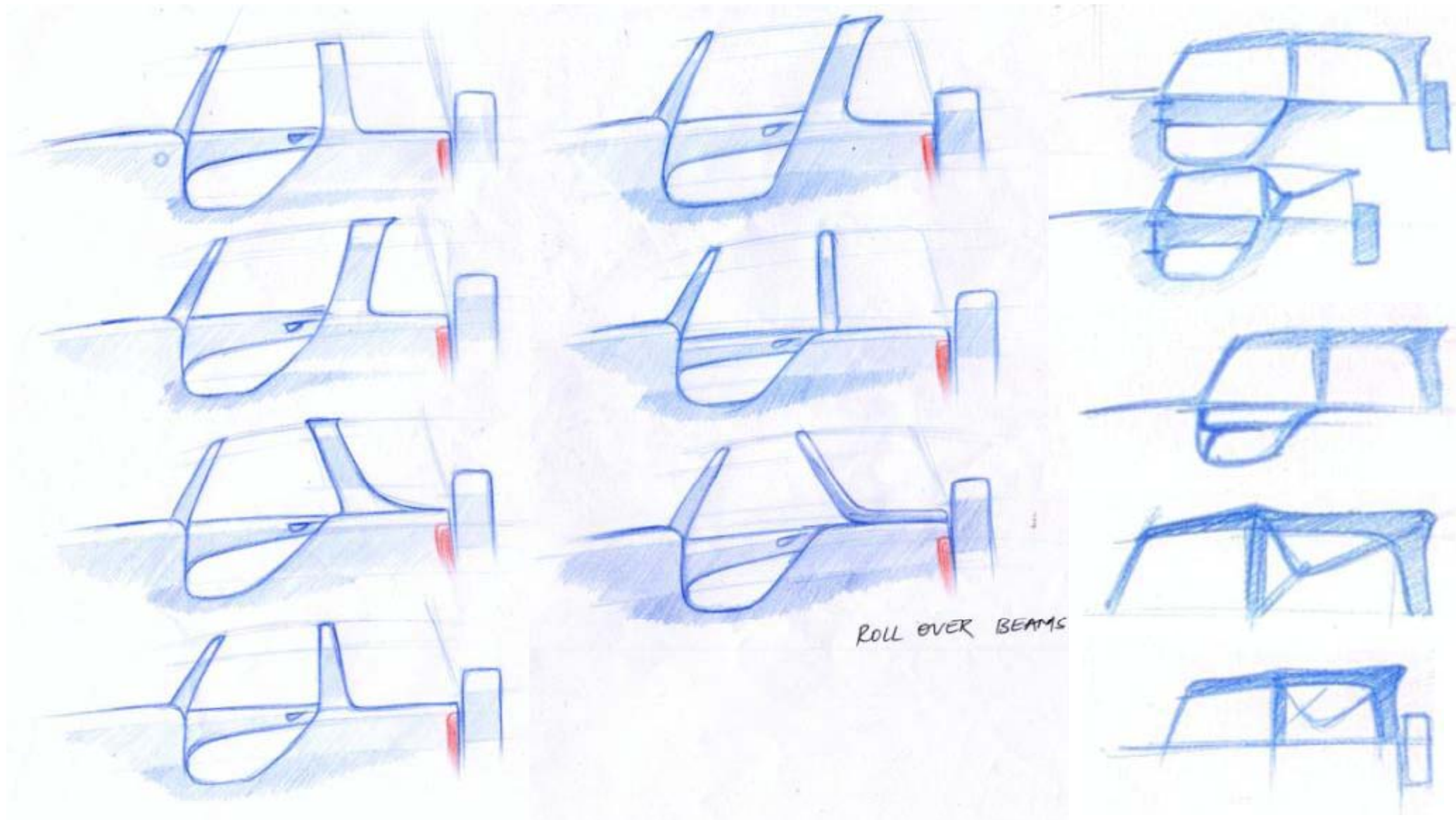
Idea Sketching



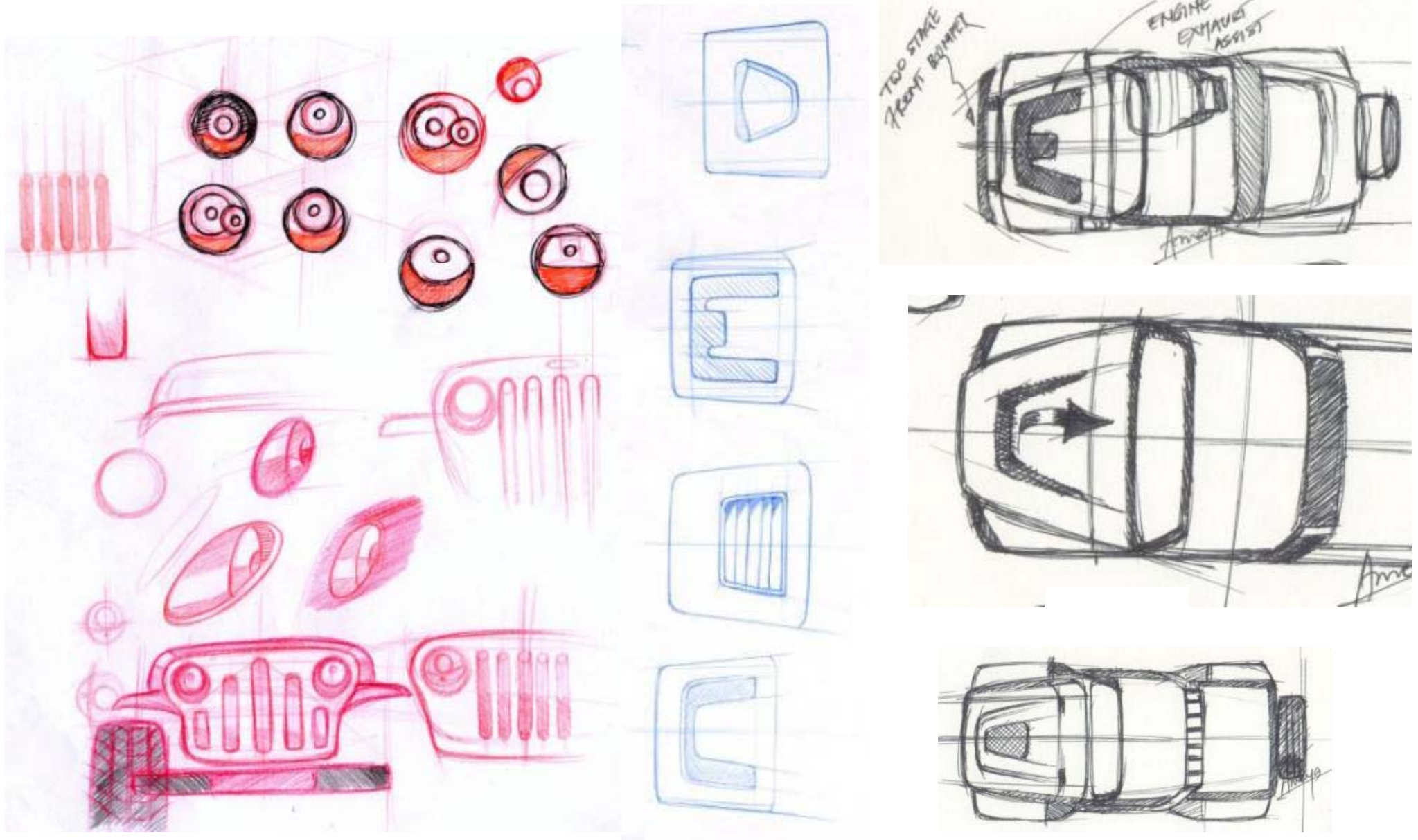
Idea Sketching



Idea Sketching



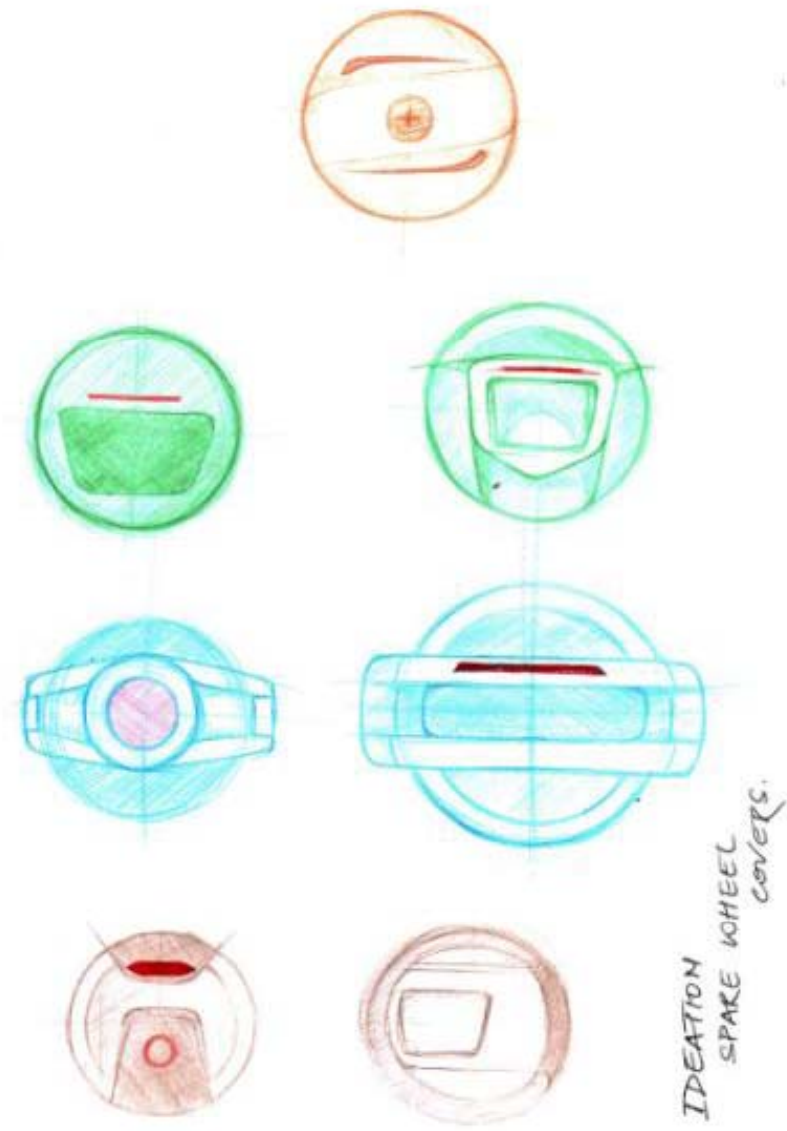
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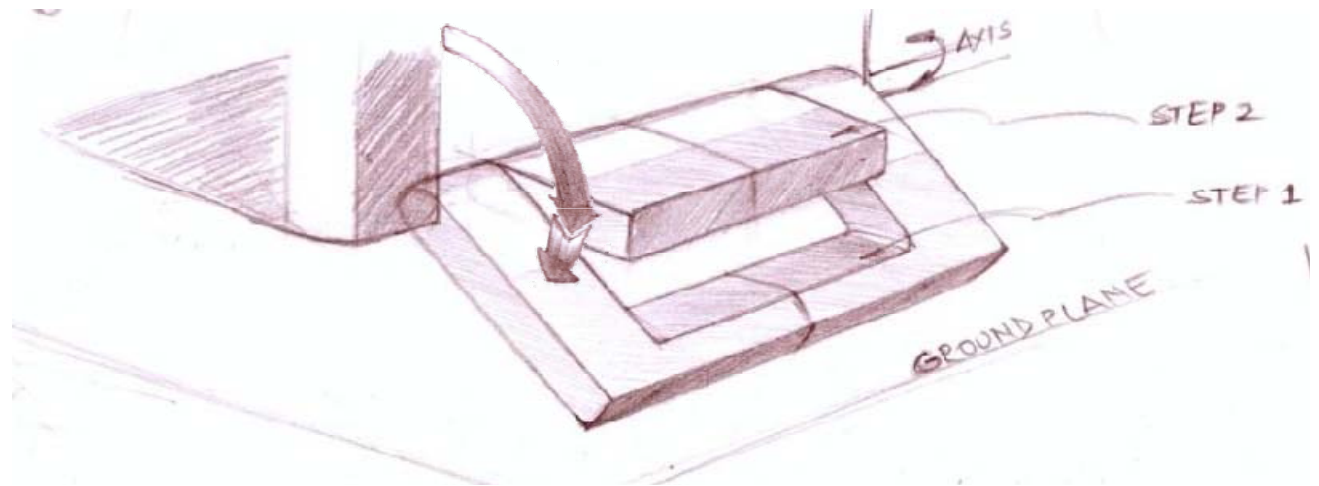
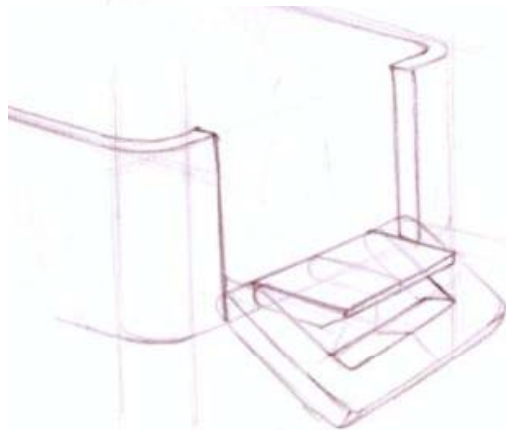
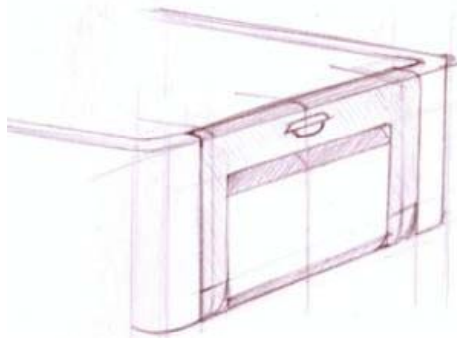
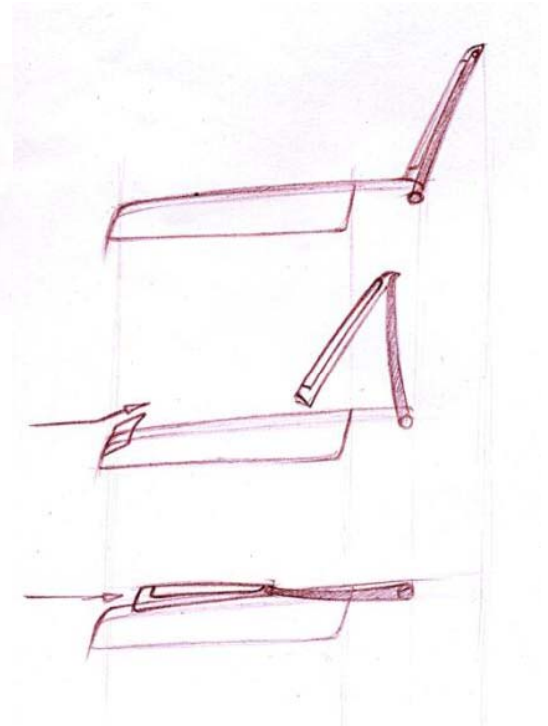
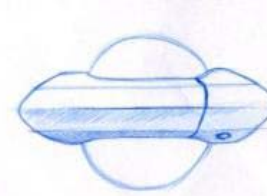
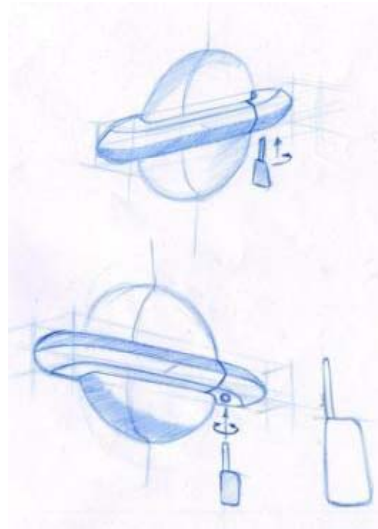
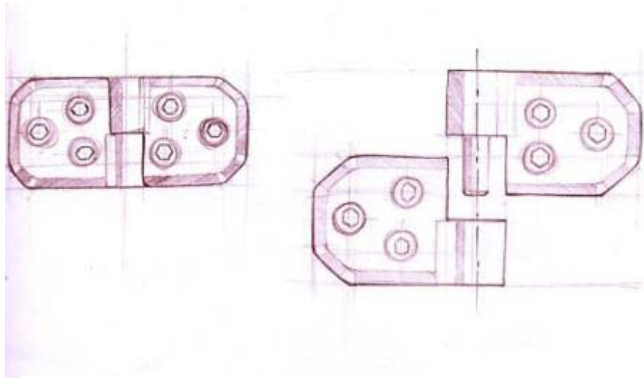
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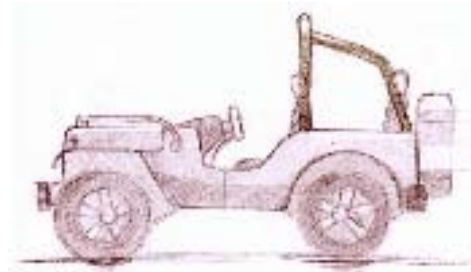


fig. 4.46



fig. 4.47



fig. 4.54



fig. 4.55



fig. 4.48



fig. 4.49



fig. 4.56



fig. 4.57



fig. 4.50



fig. 4.51



fig. 4.58



fig. 4.59



fig. 4.52

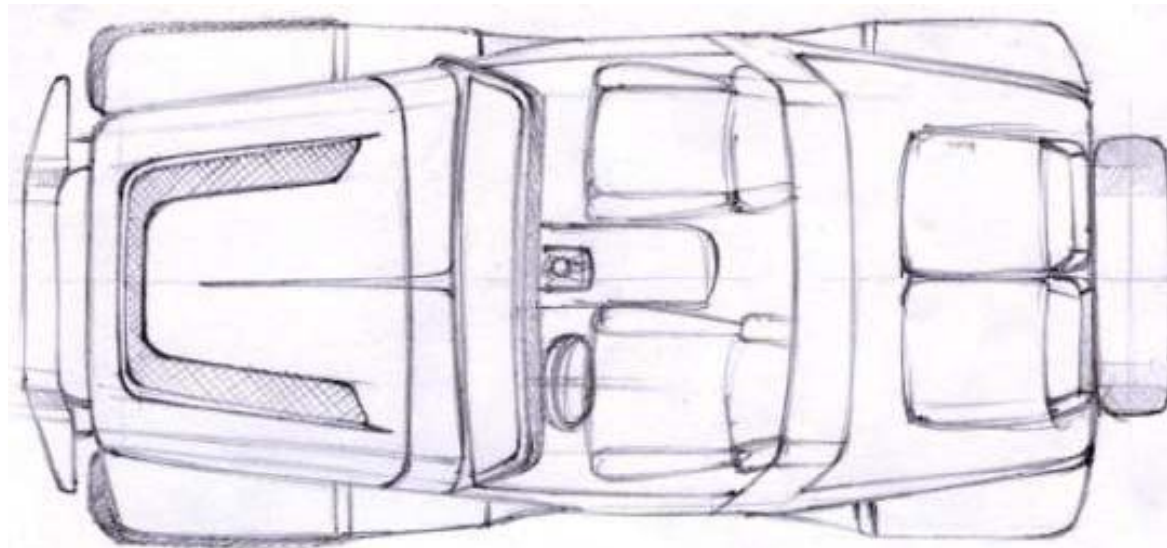
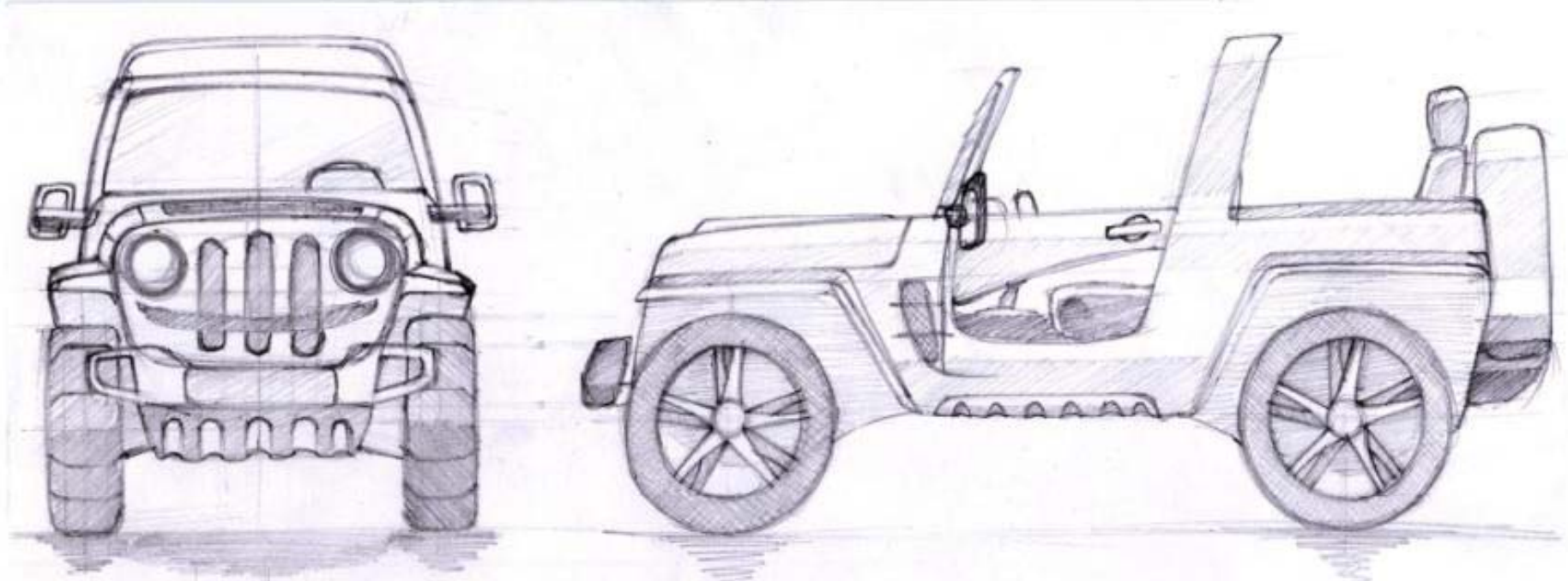


fig. 4.53



fig. 4.60

Refinement Sketches



Final Concept Rendering



Design Brief

Aim

To **redesign** the existing military jeep, **for various scenarios** as used in the Military, also **preview a civilian version** of the same vehicle with minimum changes, so as to be road-legal.

USP

The Indian Military in each of its sub-disciplines the Army, the Navy and the Air Force is **getting better and better everyday acquiring the latest technology**. The last few years have seen **betterment in equipment and gear carried by the soldiers** too. The specialist vehicles have also been looked at and **more powerful and better designed vehicles have made their way into the Indian Military**.

The Jeep has always been associated with the Indian Military and some **new and fresh vehicle is required** with **better aesthetics and design features as per current trends** so as to make it desirable to the new generation of soldiers.

Core benefits

The new vehicle will be an **evolution of the existing vehicle**, evolving on all of the design features found in the previous vehicle. The vehicle will **grow on the design positives** of the old vehicle as well as **introduce newer safety features** as required by the current road-safety scenario.

The styling will also look at making the vehicle portray itself as being able to bear all the physical abuse the user would like to impose upon the vehicle.

Design Brief

Broad specifications

Wheel base/track:	2275 mm/1400 mm
Tyre:	P240/70 R16 Radial Tubeless
Ground clearance:	230 mm
Transmission:	6-speed Dual clutch, fully Automatic Direct Shift Gearbox.
Engine:	2.2L CRDe, all Aluminum block, 4-cylinder inline, Diesel.
Turbo:	Single Variable Turbine Geometry Garret Turbocharger, 2.4psi.
Power:	120Bhp@4000rpm
Torque:	285Nm@1800rpm
Seating Capacity:	4 adults
Drive:	All wheel drive, 60/40 split to Rear, Low-range shift-on-the-fly.
Suspension:	All wheel Independent Suspension.
Artillery:	Light Artillery Mounting provision.

User profile

Primary user

The primary user would be the **army soldier** or the off-road enthusiast.

Secondary user

The secondary user would be the **service crew**, the maintenance staff.

User behaviour

The vehicle should be able to sustain severe physical abuse, with-holding its form and stance.

Design Brief

Product environment

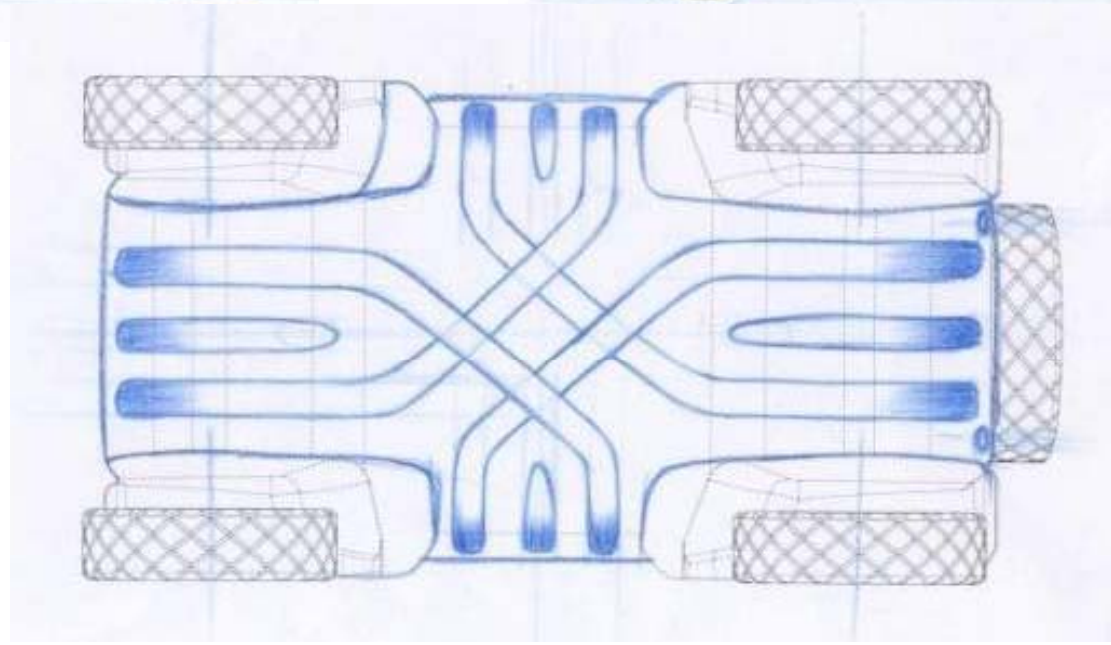
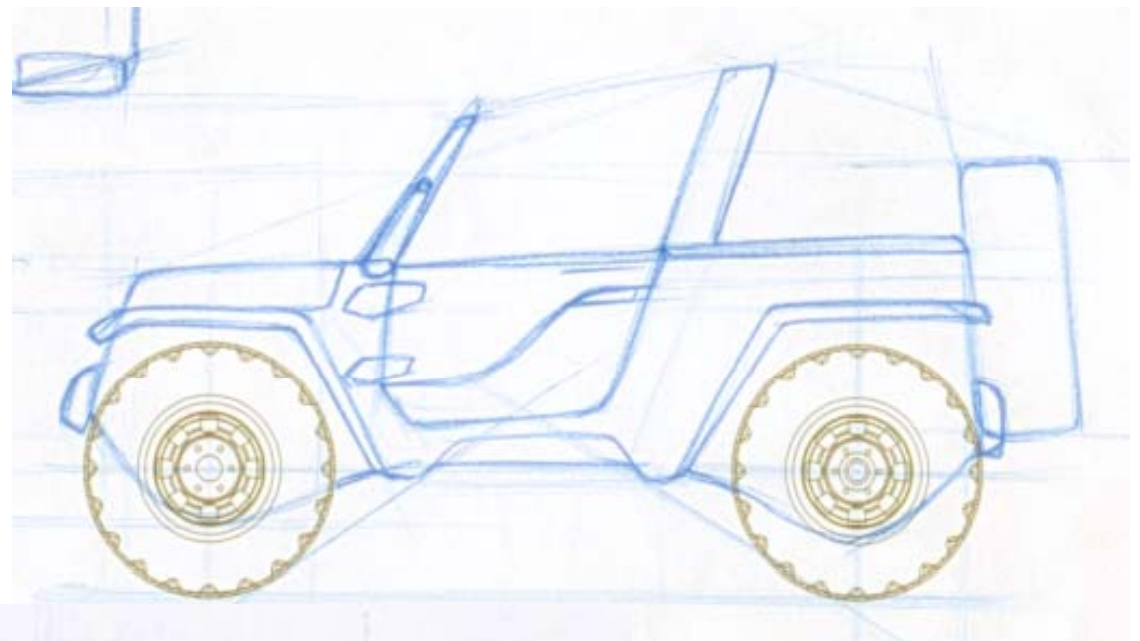
The Military Jeep in India is used for the following:

- **Primary Reconnaissance** – patrolling the Line of Control or areas around military base camps, mainly during night.
- **Tank-Hunting** – spotting enemy battle-tanks camouflaged and hidden in the battlefield.
- **Support Vehicle** for another Heavier Specialist Vehicle - carrying Live Shells for the weapon.
- **Mobile Communication Centre** for a Heavier/Fixed Installation and ground troops.
- To aid any kind of **Material Handling** inside or outside the Military Base.
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- **Transport soldiers** from their homes in civilian areas to their Military Base Camps and vice-versa.

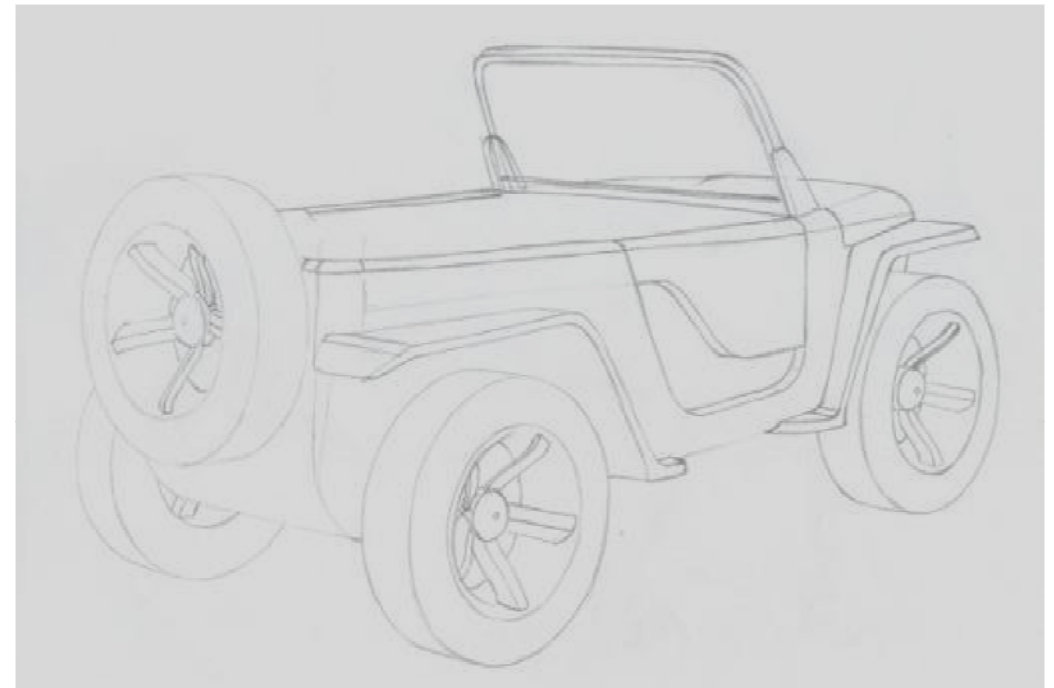
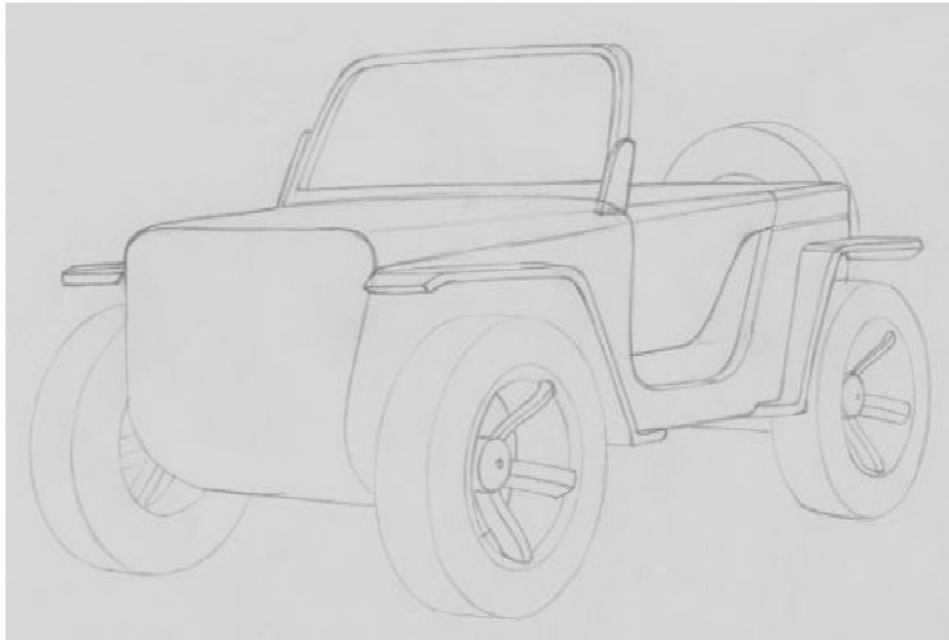
Design restrictions

The project **does not deal with** the design process for the **interiors of the vehicle**. A few details of the interiors which would affect exterior styling are mentioned. **Seating layout will be looked into** since it directly affects ingress and egress of rear seat passengers.

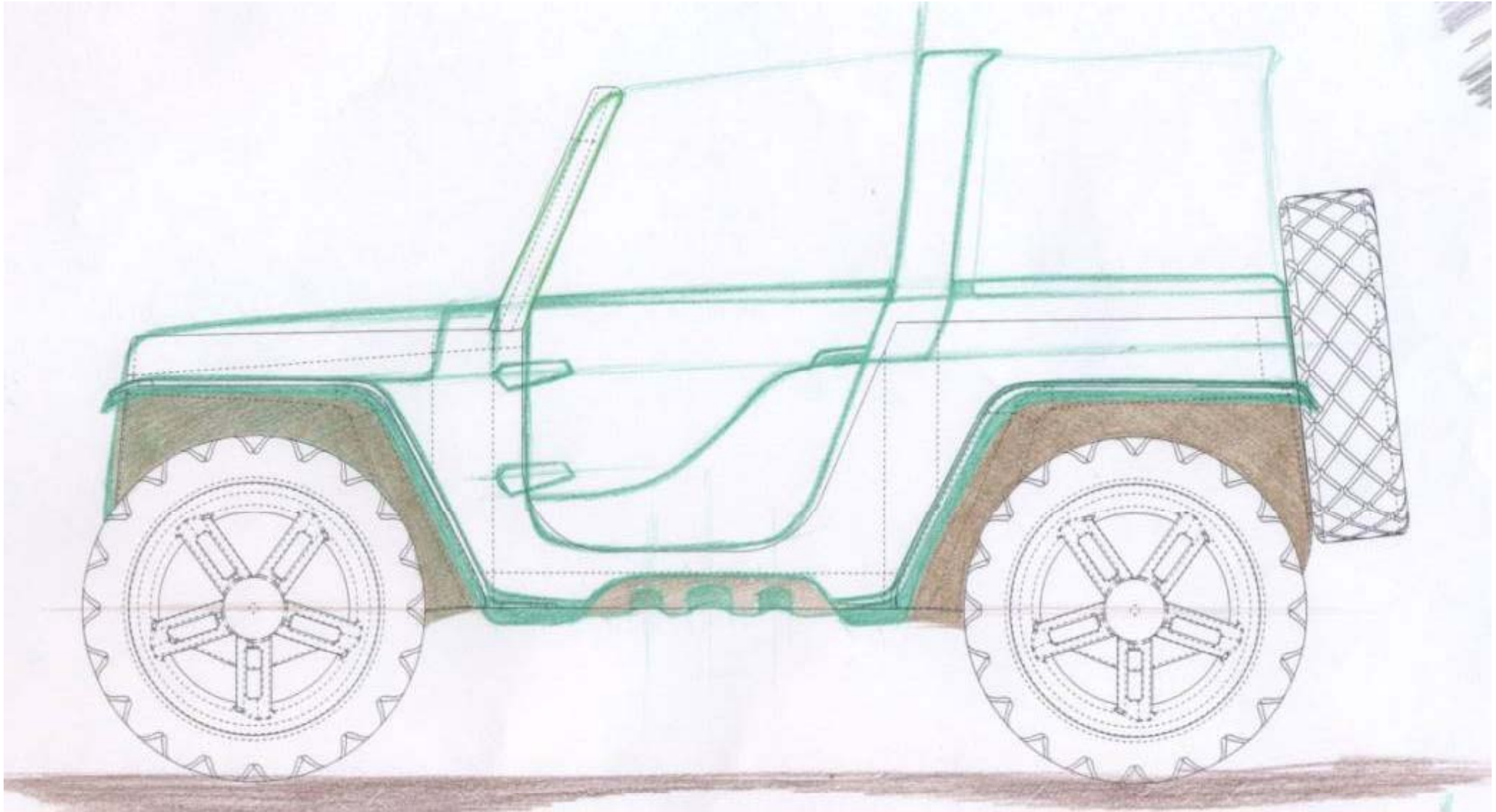
Further Exploration of Final Concept



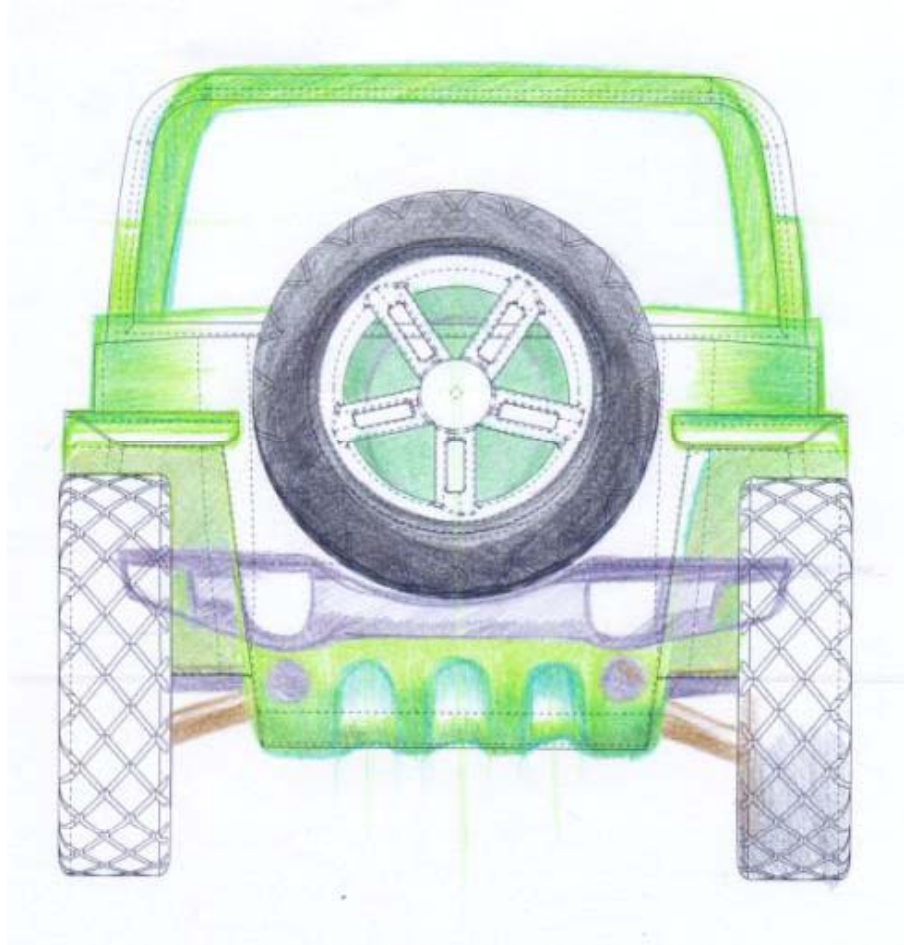
Further Exploration of Final Concept



Further Exploration of Final Concept

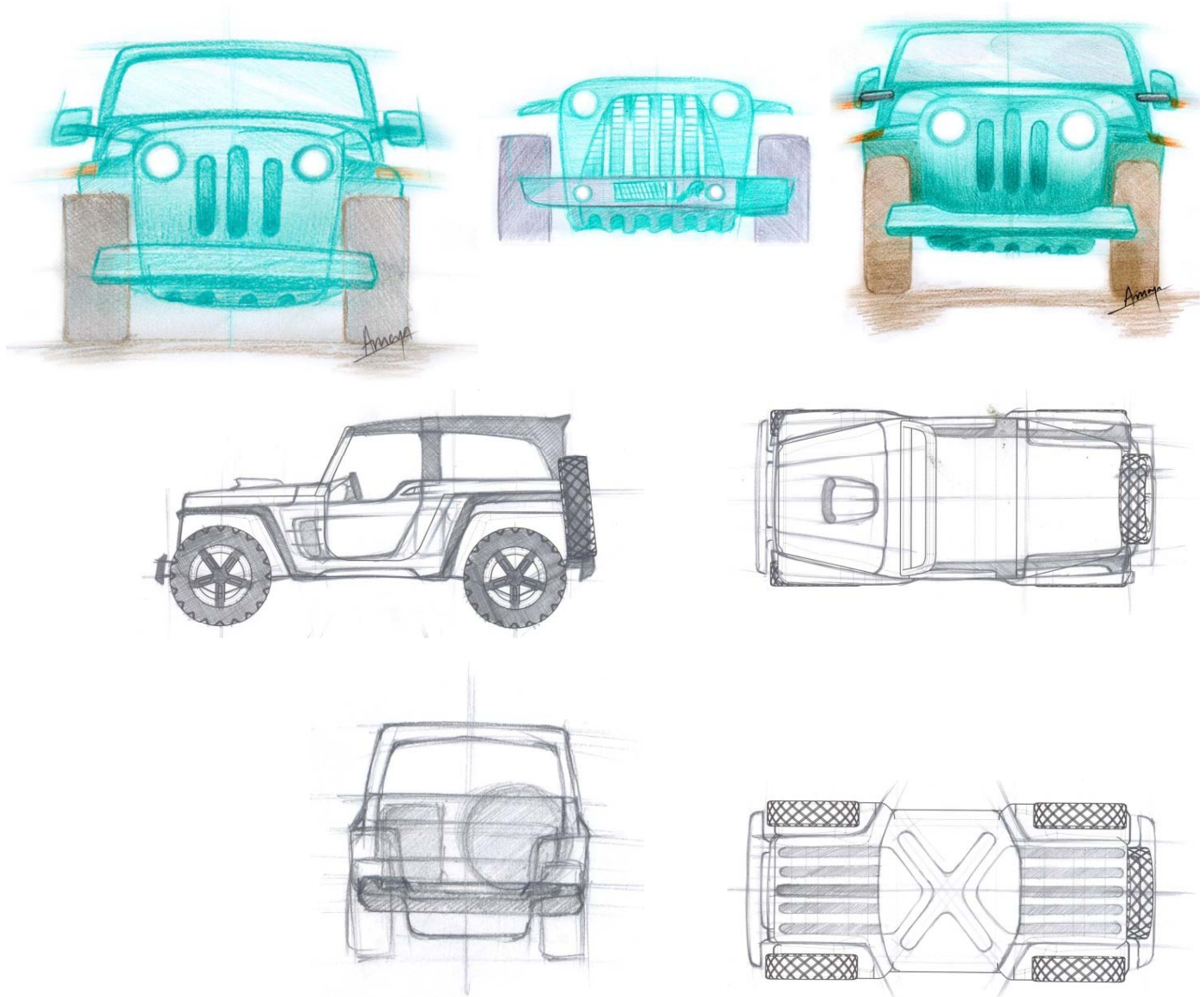


Further Exploration of Final Concept



Concept Finalisation

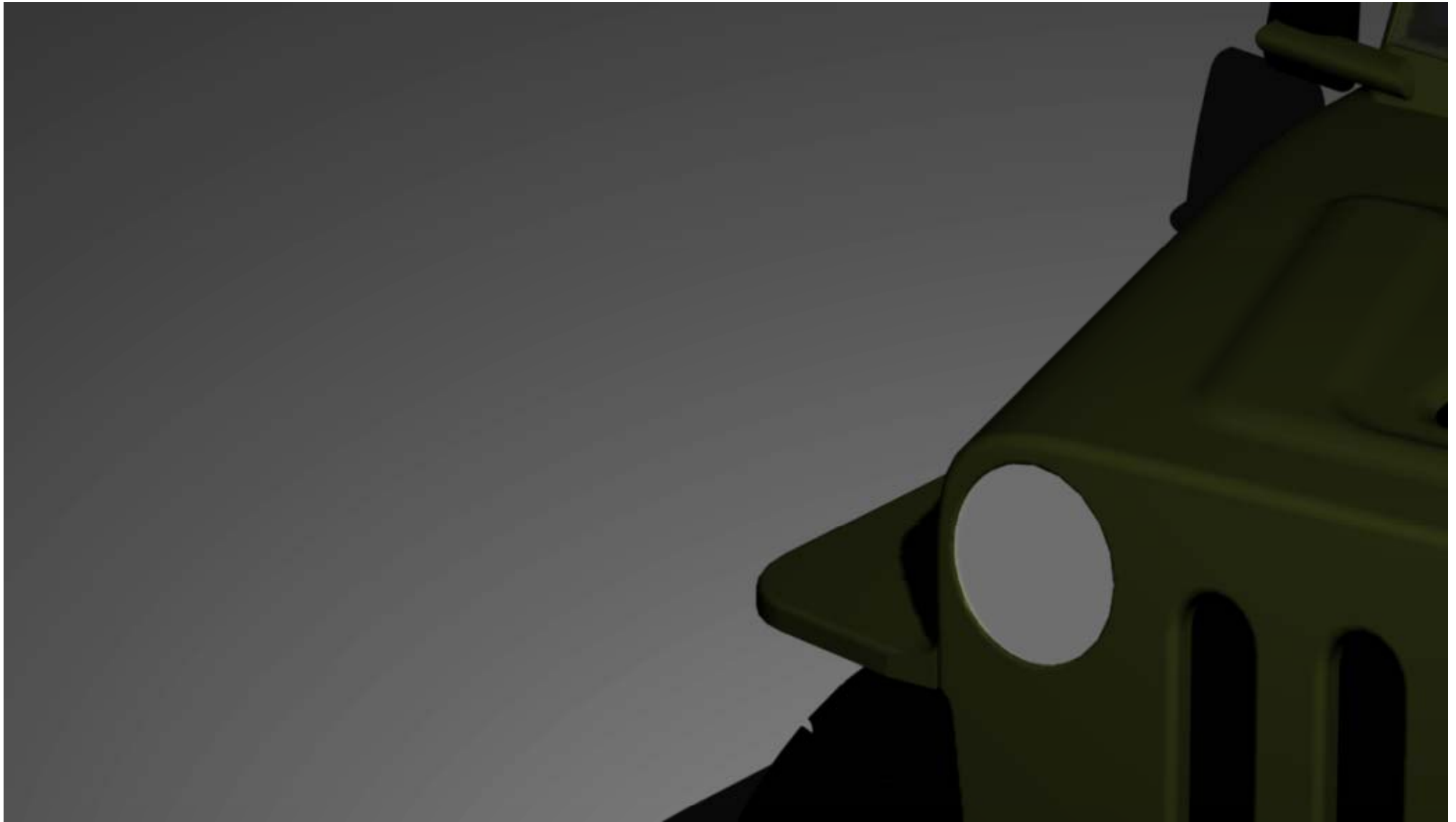
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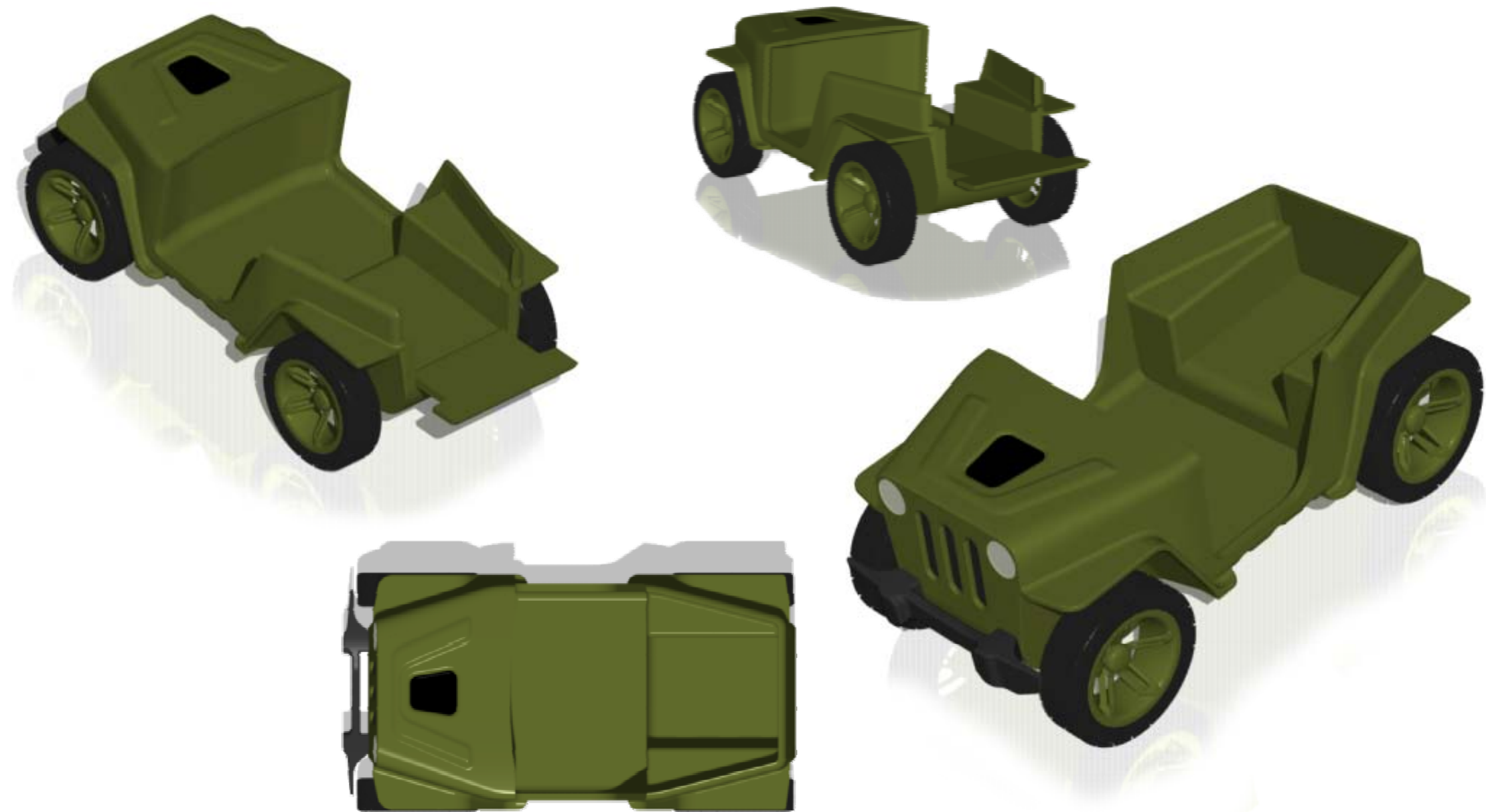
Rough CAD made from the refinement sketches



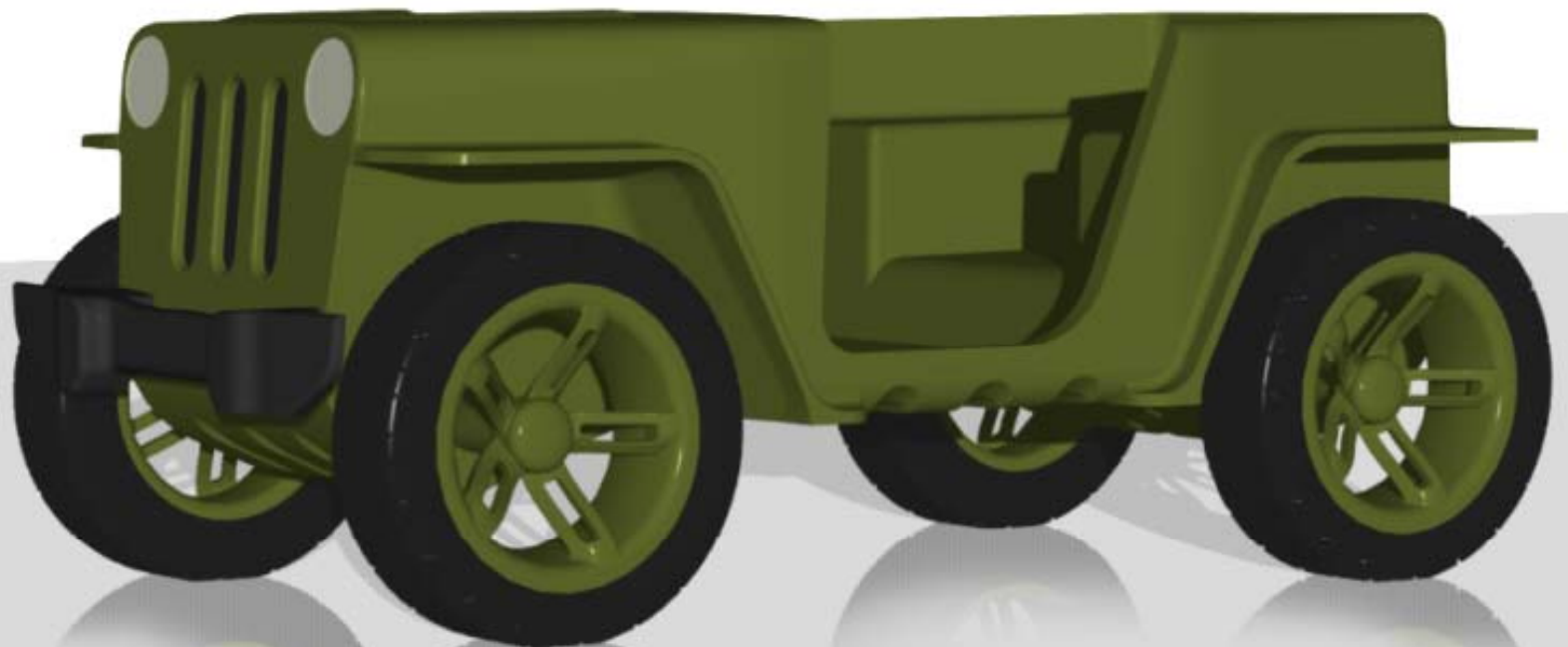
Further refinement of Rough CAD models



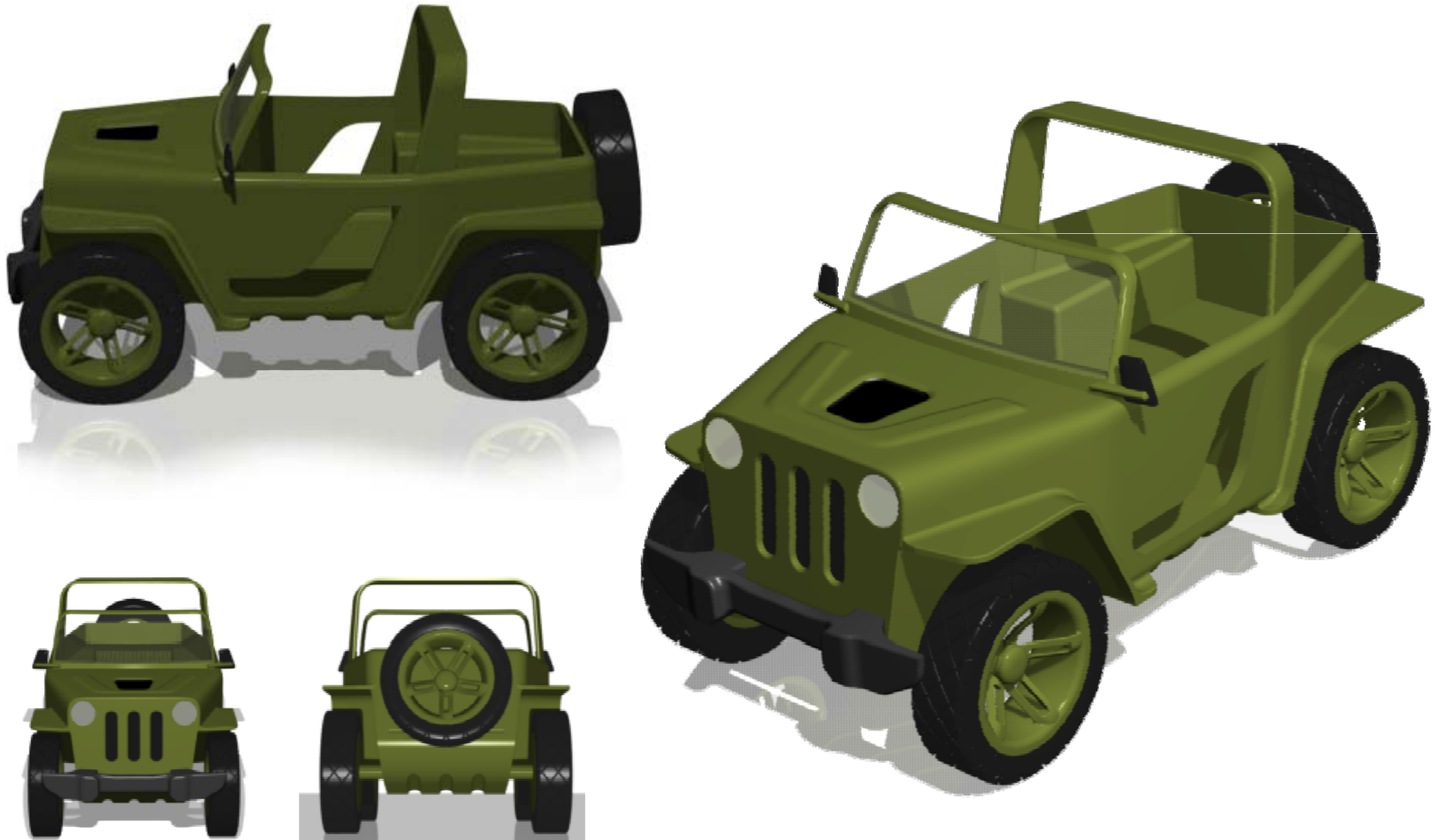
First Version: Frontline Jeeps



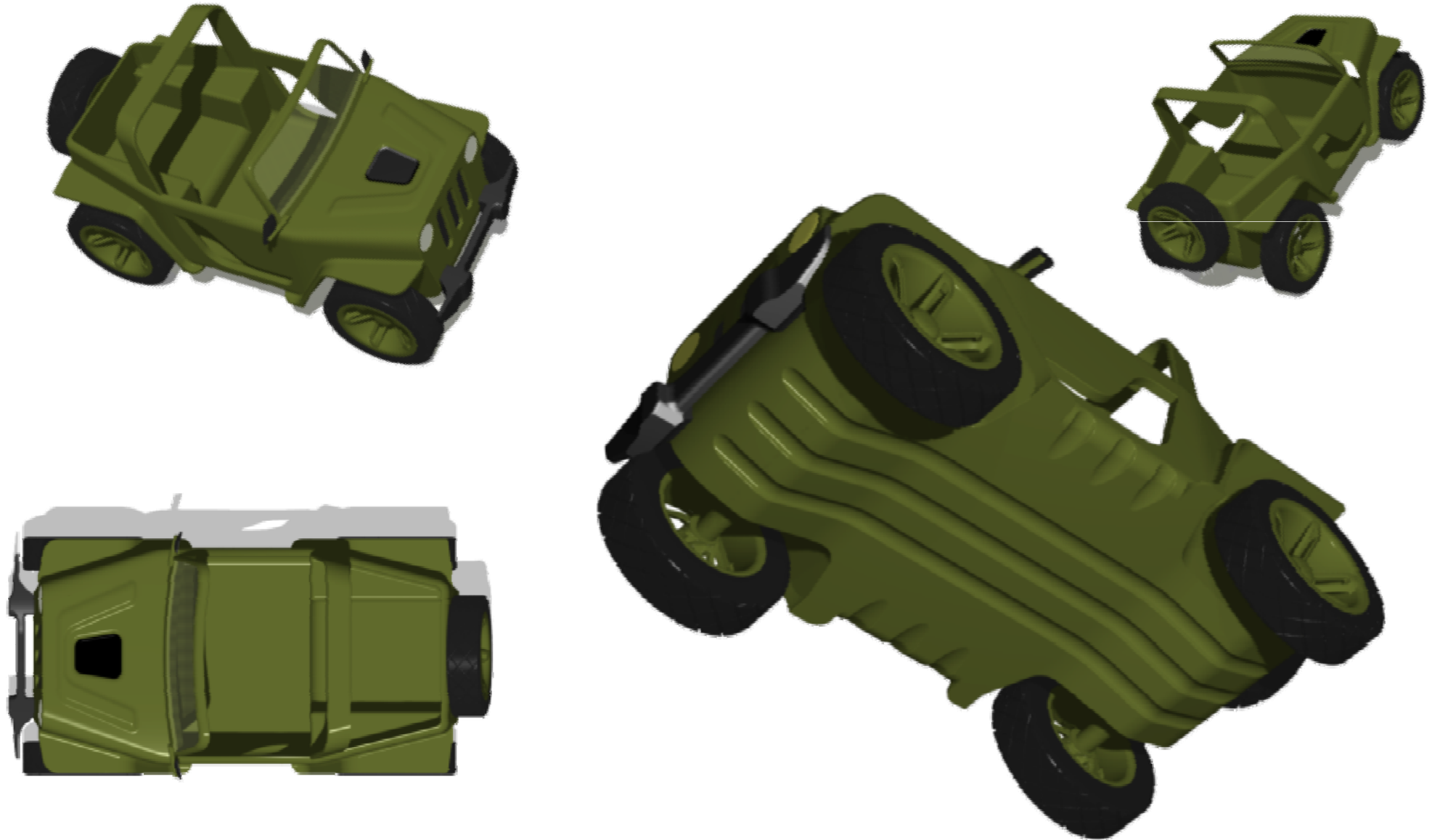
First Version: Frontline Jeeps



Second Version: Passenger Jeeps



Second Version: Passenger Jeeps



Second Version: Passenger Jeeps



Thank you