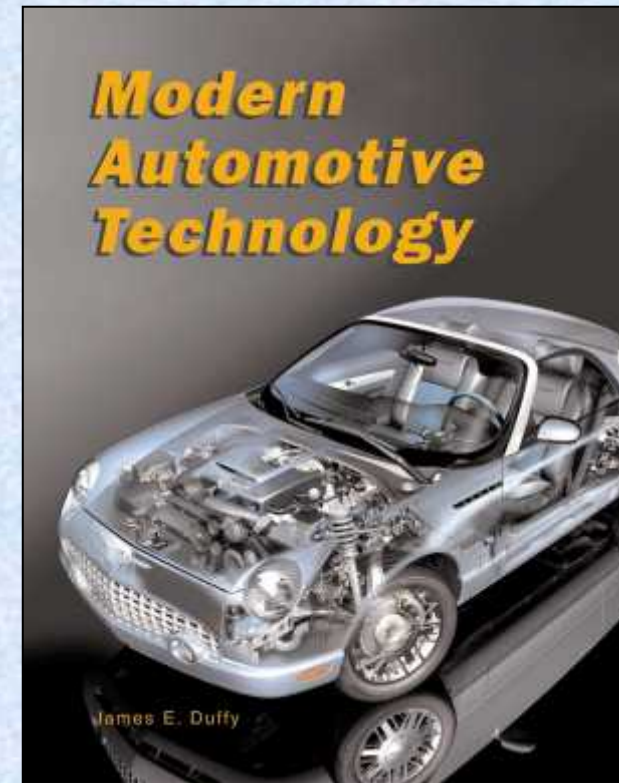


powerpoint for

Modern Automotive Technology

by

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Chapter 5

The Auto Shop and Safety

Contents

- Auto shop layout
- Shop safety
- Types of accidents
- General safety rules

Safety



If basic safety rules are followed, an auto shop can be a safe and enjoyable place to work

Auto Shop Layout

- ❑ There are several different areas in an auto shop
- ❑ These areas include:
 - repair area
 - toolroom
 - classroom
 - locker room

Repair Area

- ❑ Includes any location in the shop where repair operations are performed
- ❑ Normally includes every area except the classroom, locker room, and toolroom

Shop Stall

- ❑ Small work area where a car can be parked for repairs
- ❑ Sometimes, each stall is numbered and marked off with lines painted on the floor

Lift

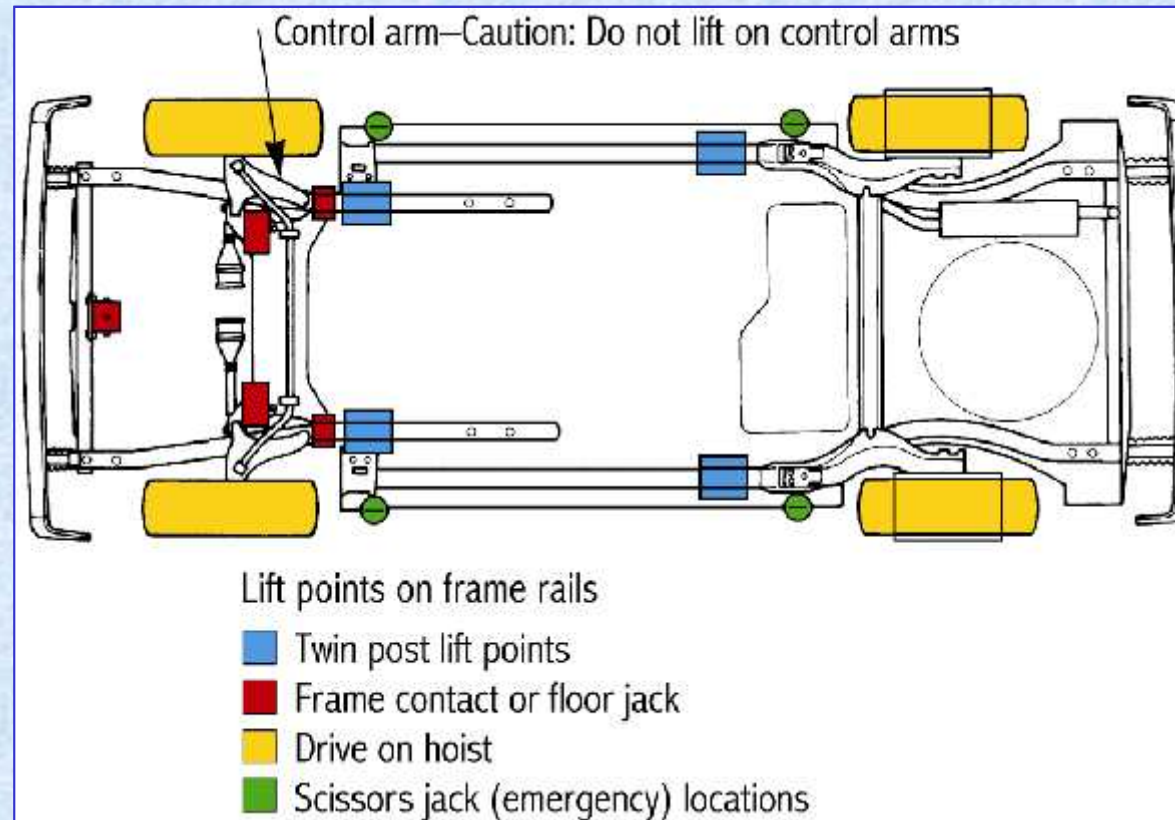
Used to raise a vehicle—useful when working under the car



Lift Safety Rules

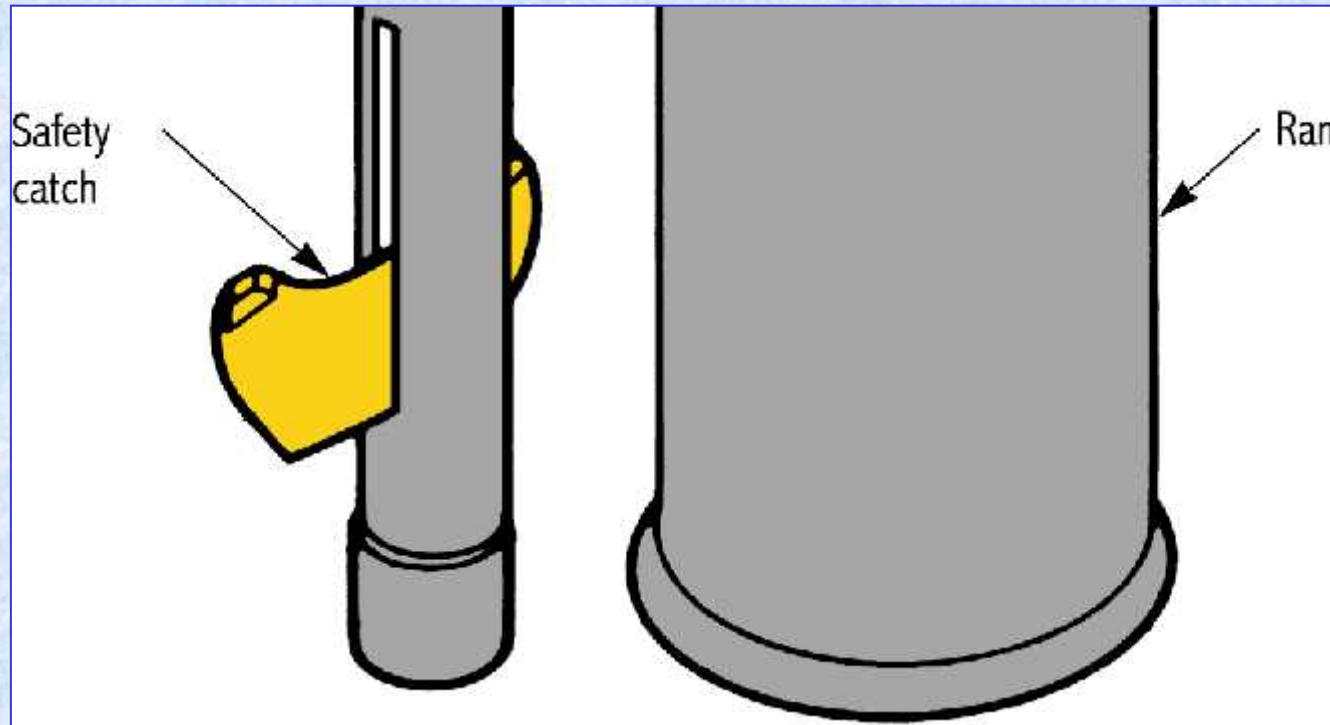
- Ask your instructor for a demonstration and get permission before using the lift
- Center the vehicle on the lift, using the lifting points described in the service manual
- Check ceiling clearance before raising trucks and campers

Lifting Points



Recommended lifting points for a specific vehicle

Safety Catch



Make sure the lift's safety catch is engaged before working under the vehicle

Alignment Rack



Specialized stall used when working on steering and suspension systems

Alignment Rack

- ❑ When using a rack, the car should be pulled on the rack slowly and carefully
- ❑ Someone should guide the driver and help keep the tires centered on the rack
- ❑ Obtain a full demonstration before using the alignment rack

Outside Work Area

- ❑ Some shops have an outside work area
- ❑ In good weather, this area can be used for auto repairs
- ❑ Always raise the shop doors all the way and pull cars through the doors very slowly
- ❑ Check the height of trucks and campers to make sure they will clear

Toolroom

- ❑ Shop area normally adjacent to the main shop or classroom
- ❑ Used to store shop tools, small equipment, and supplies
- ❑ When working in the toolroom, you must keep track of shop tools
- ❑ Every tool checked out of the toolroom must be recorded and called in before the end of the class period

Toolroom



Keep all shop tools clean and organized

Classroom

- ❑ Used for seminars, demonstrations, and other technician training activities
- ❑ May also be used for employee meetings

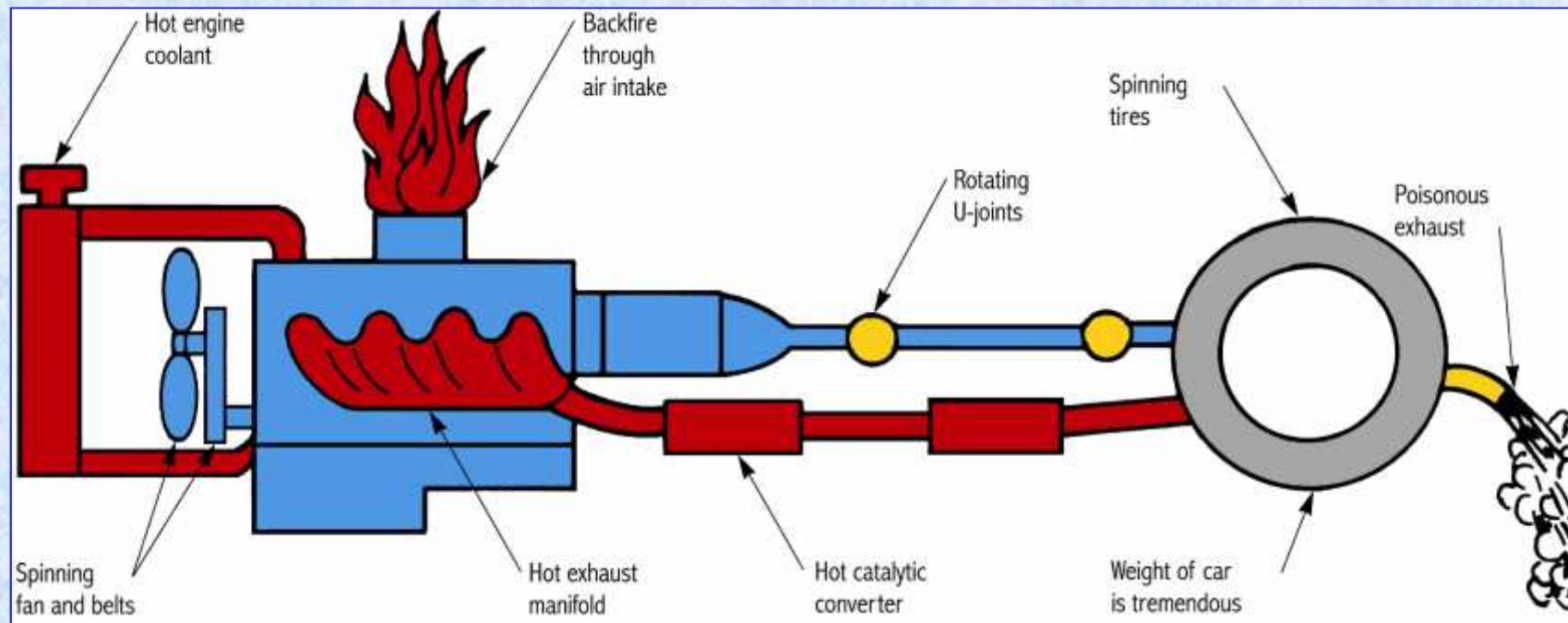
Locker Room

- Usually located adjacent to the main shop
- Provides an area for changing into your work clothes
- Always do your part to keep the locker room clean and orderly

Shop Safety

- ❑ Every year, thousands of technicians are accidentally injured or killed on the job
- ❑ Most of these accidents result from a broken safety rule
- ❑ While working, constantly think of safety

Potential Dangers



These are just a few of the dangers present around an automobile

Types of Accidents

- ❑ Be aware of and try to prevent six kinds of accidents:
 - fires
 - explosions
 - asphyxiation
 - chemical burns
 - electric shock
 - physical injuries

Plan Your Actions

- ❑ If an accident or injury occurs in the shop, notify your instructor immediately
- ❑ Use common sense when deciding whether to get a fire extinguisher or to take other actions

Fires

- ❑ Capable of causing severe injury and permanent scar tissue
- ❑ Every precaution must be taken to prevent fires
- ❑ There are numerous combustible substances found in the shop:
 - gasoline
 - oily rags
 - paints and thinners

Gasoline Safety Rules

- ❑ Store gasoline and other flammables in approved, sealed containers
- ❑ When disconnecting a fuel line or hose, wrap a shop rag around the fitting
- ❑ Disconnect the battery before working on a fuel system

Gasoline Safety Rules

- Wipe up gasoline spills immediately
- Keep any source of heat away from fuel system parts
- Never use gasoline as a cleaning solvent

Storage of Combustibles

- Soiled rags should be stored in an approved safety can
- Paints, thinners, and other combustibles should be stored in a fire cabinet
- Never set flammables near a source of sparks, flames, or heat
- Note the location of all fire extinguishers in your shop

Electrical Fires

- ❑ Result when a current-carrying wire touches ground
- ❑ Wire can heat up, melt the insulation, and burn
- ❑ Other wires can then do the same
- ❑ To prevent electrical fires, always disconnect the battery when instructed to do so in a service manual

Explosions

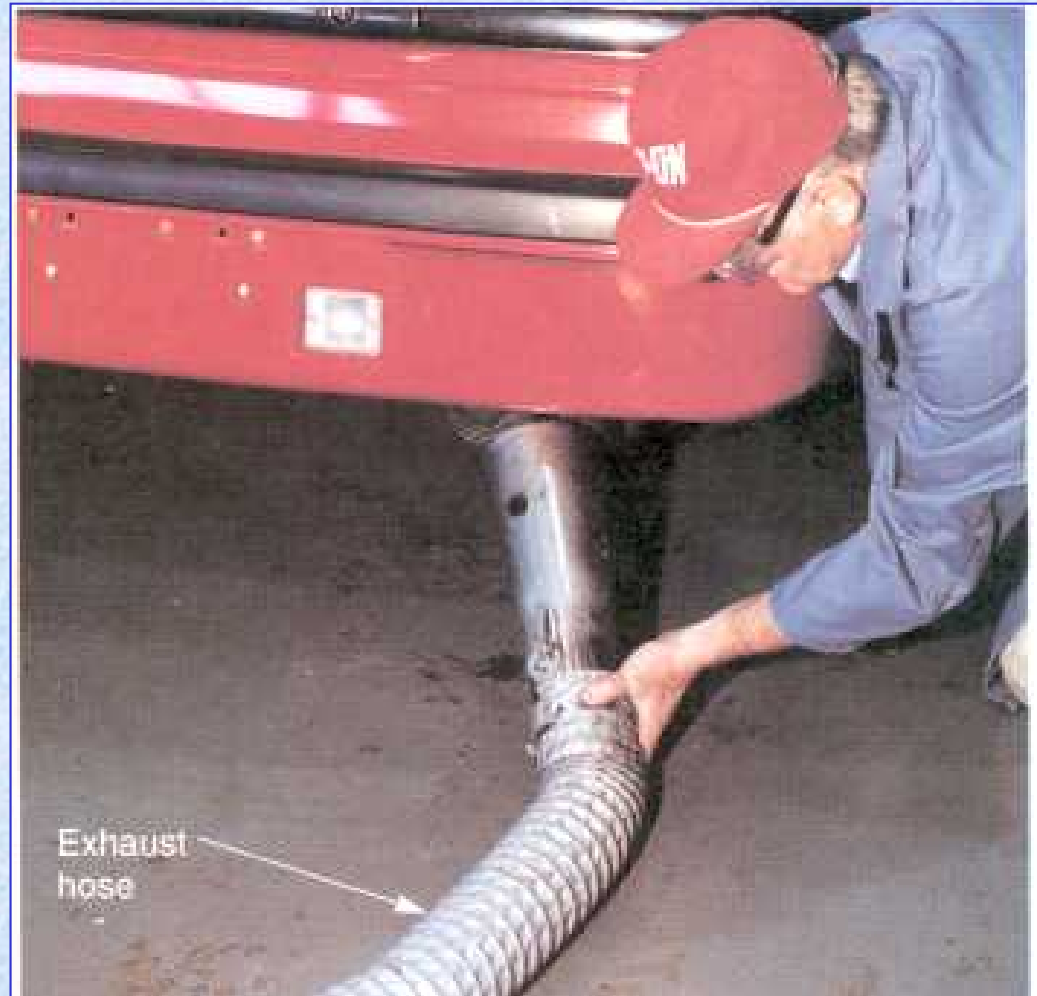
- ❑ Rapid, almost instant, combustion of a material that causes a powerful shock wave to travel through the shop
- ❑ There are several potential causes of explosions in the shop:
 - hydrogen gas emitted by batteries
 - fuel tanks or containers
 - sodium-filled engine valves
 - welding tanks and propane bottles

Asphyxiation

- ❑ Caused by breathing toxic or poisonous substances
- ❑ Causes dizziness, headaches, vomiting, and even death
- ❑ Automobile exhaust gases cause most cases of asphyxiation in automotive shops

Asphyxiation

Place an exhaust hose over the tailpipe of any vehicle running in an enclosed shop



Harmful Substances

- ❑ Other shop substances are harmful if inhaled
- ❑ These substances include:
 - asbestos dust from brake or clutch linings
 - parts cleaners
 - paint spray

Harmful Substances

This technician is wearing a respirator for protection from toxic welding fumes



Chemical Burns

- ❑ Solvents, battery acid, and various other shop substances can cause chemical burns
- ❑ Always read the directions on all chemical containers
- ❑ Wear proper protective gear when handling solvents and other caustic materials

Chemical Burns

Protective gear for preventing chemical burns



Carburetor Cleaner

- ❑ Very powerful decarbonizing product that can severely burn your skin in a matter of seconds
- ❑ Wear rubber gloves when using carburetor cleaner

Electric Shock

- ❑ Result of electric current passing through parts of your body, causing injury or death
- ❑ Can occur when using improperly grounded electric power tools
- ❑ Never use an electric tool unless it has a functional ground prong
- ❑ Never use an electric tool on a wet shop floor

Physical Injuries

- ❑ Can result from hundreds of different accidents
- ❑ You must evaluate every repair technique
- ❑ Decide whether a particular operation is safe and take action as required
 - For example, if you are pulling on a wrench as hard as you can and the fastener will not turn, **stop** and find a wrench with a longer handle

General Safety Rules

There are several general safety rules that should be followed at all times

Safety Rules

- Wear eye protection during any operation that could endanger your eyes
- Avoid anyone who does not take shop work seriously
- Keep your shop organized
- Dress in an appropriate manner

Safety Rules

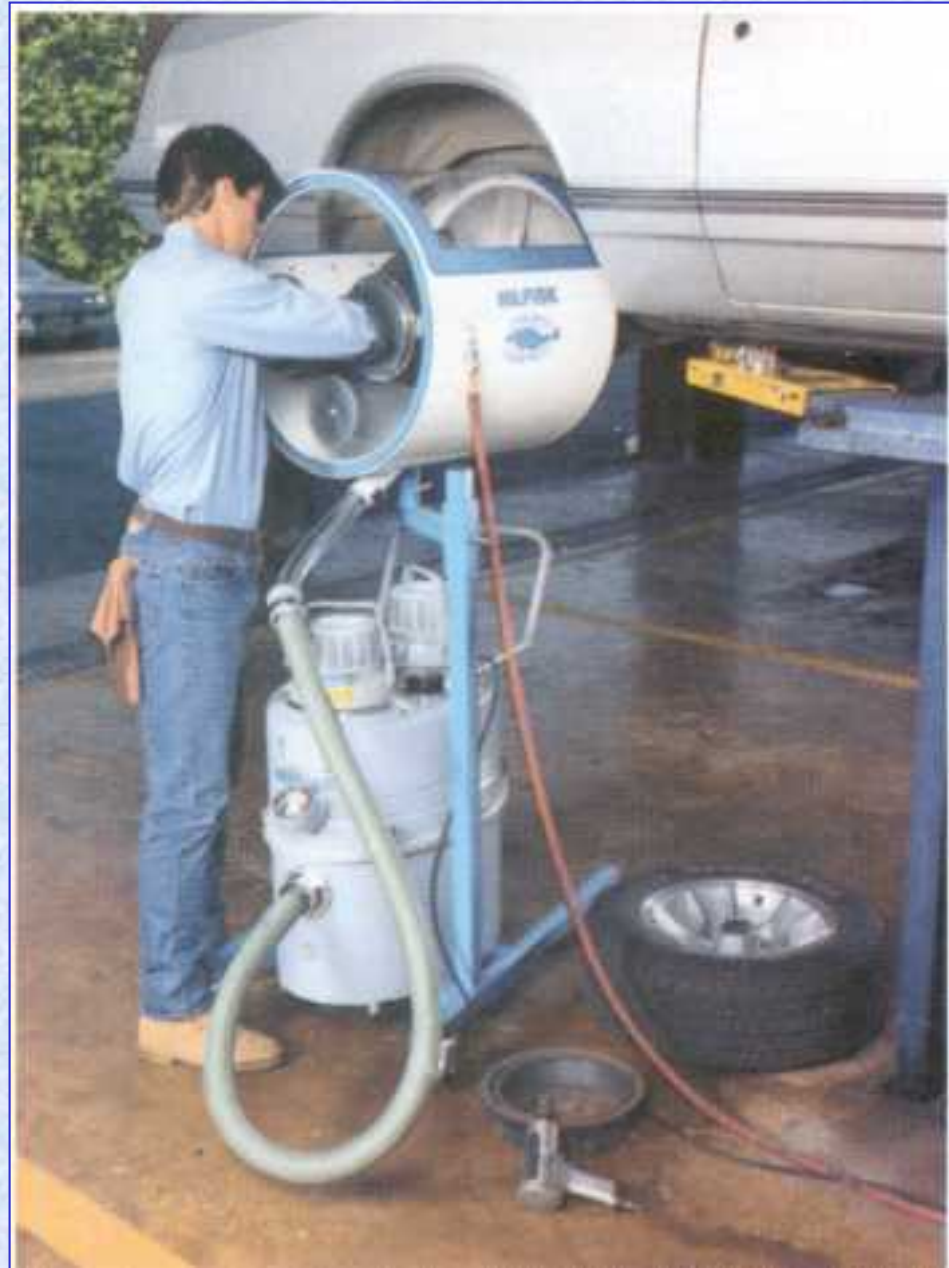
- Never carry sharp tools or parts in your pockets
- Wear full face protection when grinding, welding, or performing other hazardous operations
- Work like a professional
- Use the right tool for the job

Safety Rules

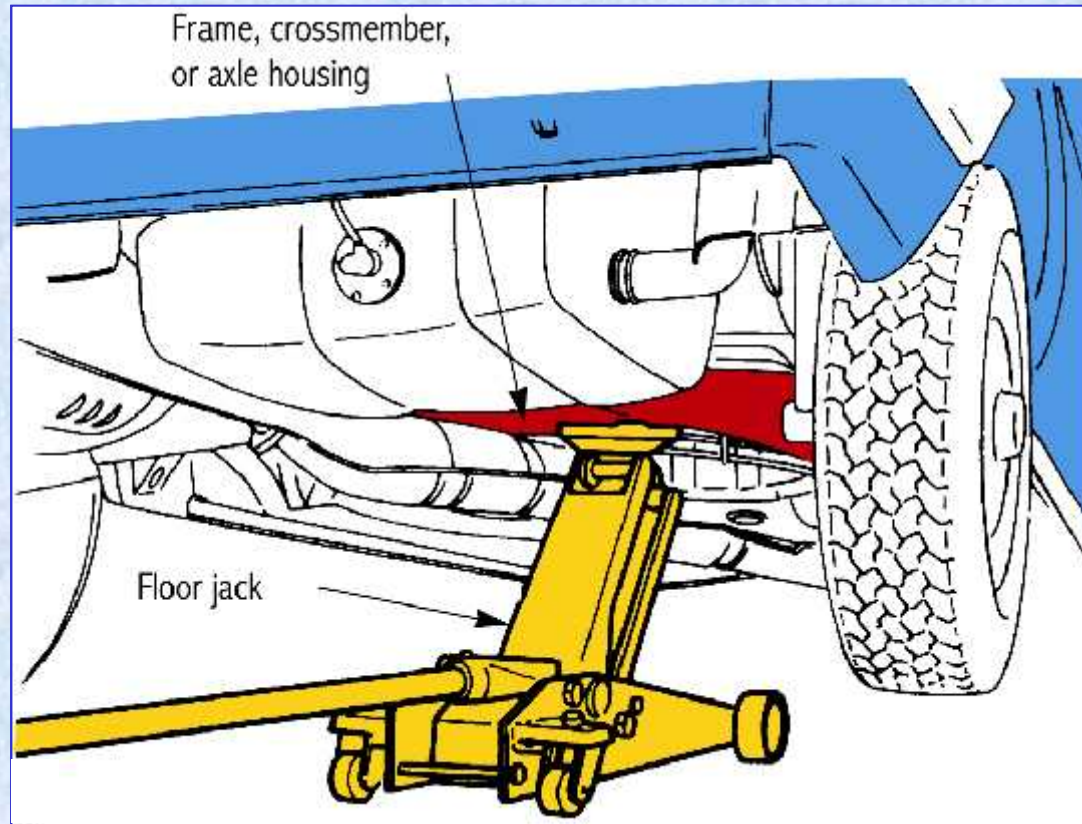
- Keep guards or shields in place
- Lift with your legs, not your back
- Use adequate lighting
- Ventilate when needed
- Never stir up asbestos dust
 - asbestos is a carcinogen
 - do not blow dust from brake or clutch parts

Safety Rules

Use an enclosed vacuum system to remove asbestos dust from parts



Safety Rules



Jack up a vehicle slowly and safely

Safety Rules



Never work on a vehicle not supported by
jack stands

Safety Rules

- ❑ Drive slowly when in the shop area
- ❑ Report unsafe conditions to your instructor
- ❑ Stay away from engine fans
- ❑ Respect running engines
 - when the engine is running, make sure the transmission is in park or neutral, the parking brake is set, and the wheels are blocked

Safety Rules

- Do not smoke in the auto shop
- Read material safety data sheets when in doubt about any dangers
- Obtain instructor permission before using any new or unfamiliar power tool, lift, or other shop equipment

Material Safety Data Sheet

MATERIAL SAFETY DATA SHEET		DATE PREPARED 3/94							
HI-TEMP PRODUCTS CO. 14936 GROVER ST. OMAHA, NEBRASKA 68144		EMERGENCY PHONE NUMBER 1-402-333-8323 1-402-359-5796	TELEPHONE NUMBER FOR INFORMATION 1-402-330-3344						
1 PRODUCT NAME: HT 0801 AKRYA Gel		<table border="1"> <tr><td>+ HEALTH</td><td>1</td></tr> <tr><td>+ FIRE</td><td>0</td></tr> <tr><td>+ REACTIVE</td><td>0</td></tr> </table>		+ HEALTH	1	+ FIRE	0	+ REACTIVE	0
+ HEALTH	1								
+ FIRE	0								
+ REACTIVE	0								
2 PRECAUTIONARY STATEMENT FROM PRODUCT LABEL WARNING WEAR SAFETY GLASSES. MAY CAUSE EYE IRRITATION. IF EYE IRRITATION OCCURS, FLUSH EYES FOR 15 MINUTES WITH WATER. IF SWALLOWED, DO NOT INDUCE VOMITING. DRINK WATER OR MILK. IN EITHER CASE, CALL A PHYSICIAN IMMEDIATELY. REFER TO MSDS FOR CHEMICAL HAZARDOUS INFORMATION. KEEP OUT OF THE REACH OF CHILDREN.		HAZARD RATING: 0 - LEAST 1 - SLIGHT 2 - MODERATE 3 - SERIOUS 4 - SEVERE							
3 HAZARDOUS COMPONENTS OSHA ->		PEL/TLV	TWA						
INGREDIENTS	%	CAS NO.	ppm						
ISOPROPYL ALCOHOL	<3	67-63-0	400						
			983						
			500						
			1230						
4 PHYSICAL/CHEMICAL CHARACTERISTICS		CEILING							
Boiling Point	212° F	ppm	mg/m ³						
Vapor Pressure (mm Hg.)	N/A	ppm	mg/m ³						
Vapor Density (Air = 1)	N/A	ppm	mg/m ³						
Solubility in water	MISCIBLE	ppm	mg/m ³						
Appearance and Odor	PURPLE THICK EMULSION, BANANA ODOR								
5 Fire and Explosion Hazard Data		STEL							
Flash Point	N/A	ppm	mg/m ³						
Extinguishing Media	WATER TO COOL DOWN CONTAINERS								
Special Fire Fighting Procedures	N/A DIRECT FLAME FROM BUTANE TORCH								
WILL NOT IGNITE MATERIAL									
Unusual Fire and Explosion Hazards	N/A								
6 HEALTH HAZARD INFORMATION - SIGNS AND SYMPTOMS OF EXPOSURE		CEILING							
SKIN: MAY IRRITATE SKIN. CAUSE LIGHT REDDENING IN PATIENTS WITH PREEXISTING SKIN DISORDERS.		ppm	mg/m ³						
EYES: MAY CAUSE EYE IRRITATION, BURNING, AND REDNESS.		ppm	mg/m ³						
SWALLOWING: MAY CAUSE MOUTH AND THROAT IRRITATION, BURNING, AND POSSIBLE ABDOMINAL DISCOMFORT OR NAUSEA.		ppm	mg/m ³						
BREATHING: PROLONGED BREATHING OF MIST MAY IRRITATE NASAL PASSAGES.		ppm	mg/m ³						
7 EMERGENCY AND FIRST AID PROCEDURES		ppm	mg/m ³						
ON SKIN: WASH WITH SOAP AND WATER. IF IRRITATION PERSISTS, SEEK MEDICAL ATTENTION.		ppm	mg/m ³						
IN EYES: FLUSH EYES WITH PLENTY OF RUNNING WATER FOR 15 MINUTES. LIFTING EYELIDS OCCASIONALLY. GET IMMEDIATE MEDICAL ATTENTION.		ppm	mg/m ³						
SWALLOWED: CALL A PHYSICIAN IMMEDIATELY. DO NOT INDUCE VOMITING. IF CONSCIOUS, DRINK PLENTY OF WATER OR MILK.		ppm	mg/m ³						
BREATHED: REMOVE TO FRESH AIR. GIVE ARTIFICIAL RESPIRATION IF NOT BREATHING. SEEK IMMEDIATE MEDICAL ATTENTION.		ppm	mg/m ³						
8 TOXICITY DATA		ppm	mg/m ³						
ORAL: N/A	DERMAL: N/A								
INHALATION: N/A		ppm	mg/m ³						
CARCINOGENICITY: NOT CONSIDERED TO BE A CARCINOGEN BY IARC.		ppm	mg/m ³						
NTP? N/A	IARC MONOGRAPHS? N/A	ppm	mg/m ³						
9 PERSONAL PROTECTION		ppm	mg/m ³						
VENTILATION: LOCAL OR MECHANICAL EXHAUST.		ppm	mg/m ³						
RESPIRATORY PROTECTION: IF NECESSARY, WEAR A PARTICLE MASK OR AN OSHA APPROVED MASK FOR MIST CONCENTRATIONS.		ppm	mg/m ³						
EYE PROTECTION: WEAR GOGGLES OR SAFETY GLASSES.		ppm	mg/m ³						
SKIN AND PROTECTIVE CLOTHING: WEAR RUBBER GLOVES.		ppm	mg/m ³						
10 HAZARDOUS REACTIVITY		ppm	mg/m ³						
STABILITY:	UNSTABLE?	CONDITIONS TO AVOID: N/A							
	STABLE?	X							
INCOMPATIBILITY: N/A		ppm	mg/m ³						
HAZARDOUS BYPRODUCTS: N/A		ppm	mg/m ³						
HAZARDOUS POLYMERIZATION:	MAY OCCUR	CONDITIONS TO AVOID: N/A							
	WILL NOT OCCUR	X							