

# SHORTCOMINGS OF TRAINING

## Impact & Improvement

who handle natural refrigerants  
and chemical refrigerants

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# Industrial scenario - Present

- Most of the manufacturers switched over to R-134a based refrigerator except Godrej
- Commercial and MAC industry had also replaced CFCs with HFCs.



# Purpose and Activities : Training

**Purpose:** Enable Engineers in the RAC servicing sector to apply good practice in handling Natural Refrigerants and to cope with the new demands of handling new refrigerants and retrofit.

**Main Activities:** Facilitation of

- Refrigeration Engineers' Training
- Upgrading of Institutions used for Training (Instructor Training /ToT and equipment support)



# Training Areas

- RSE Engineers
- MAC Engineers
- OTC Engineers
- Chillers Engineers



# WHO IS BETTER?

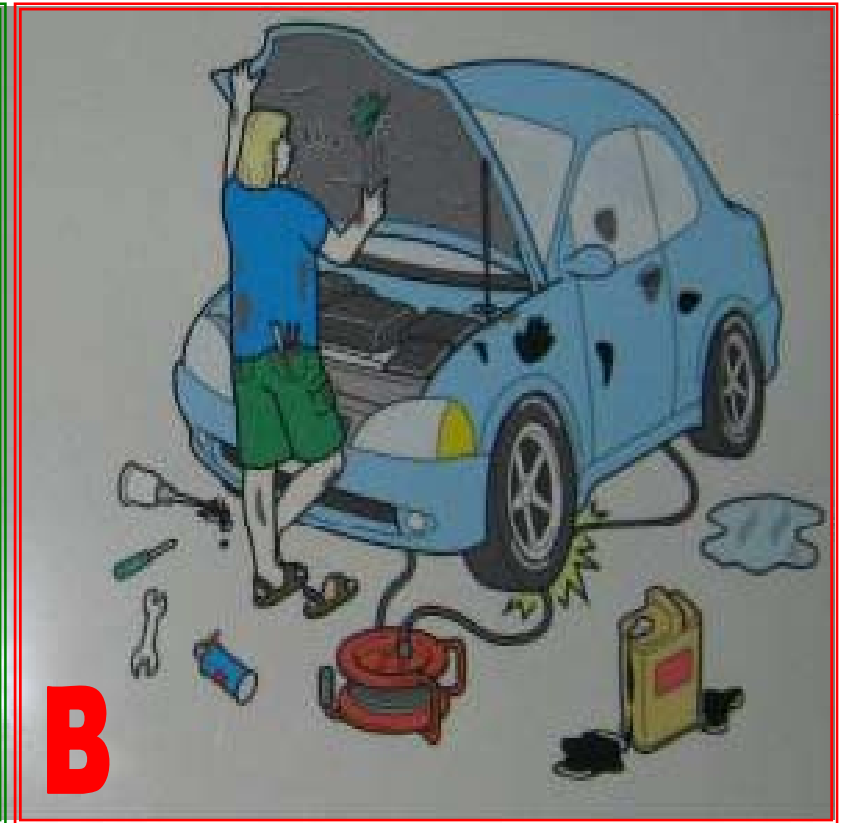
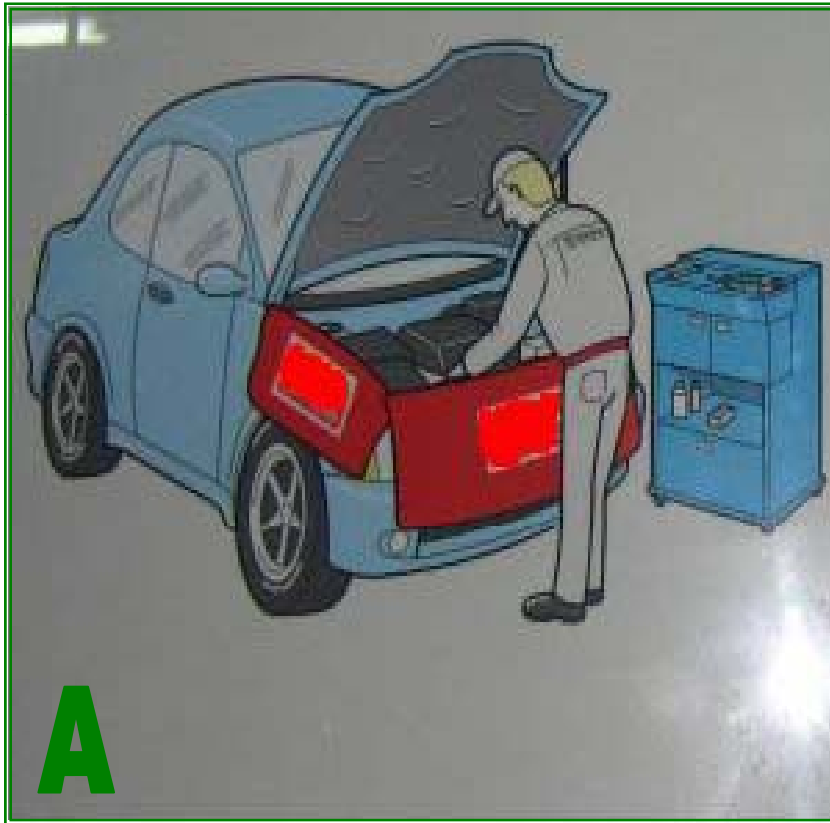


**A**



**B**

# WHO IS BETTER?



# SHORTCOMINGS IN TRAINING

- Availability of Natural Refrigerant
- Price in comparison to HFC
- Local Refilling
- Confidence level



# SHORTCOMINGS IN TRAINING

- Fear of Flammability
- Lack of standard Tools & Equipment
- Budget of Training
- No feedback after two – three months
- No producers/suppliers support





## Feedback from those who have Retrofitted

- Performance on par with R-12/134a on running vehicle
- Initial cooling takes more time than R-12/134A
- Could have done more if HC cans were available
- Retrofitted during ambient temp around 30 & hence not sure about its performance in peak Summer
- Cooling Performance on idle running of engine is not satisfactory .
- Cooling in peak summer (42 C & above) is poor ( customer complaints)
- For Retrofitting with HC blend takes more time & affects their thru put in Summer where demand is more
- HC blend does not allow them to top up refrigerant (being blend )
- To charge with HC blend ,it is necessary to have E &C unit & weighing scale whereas they could manage without in case of HFCs



# Our Assessment

- Genuine feedback & real concerns.
- Needs further hands on Training & Observation.
- As these shops are road side service stations: they are used to top up refrigerant in most cases & quickly dispose the customer in peak periods .
- Many who have done retrofit did without weighing scale & proper Vacuum & mostly by judgment
- Though they admit it is possible to get performance with HC blend no one wants to take chance as it is expensive to recharge once again in case of failure as recovery of HC is not possible .It is expensive.



# Our Assessment

- Cost of 134A is much lower.
- Customer education is needed to retrofit but technicians do not want to explain more on HCs as they are always busy with their routine customers.



# Impact of adoption of good service practices

- Ensures proper operation of serviced appliances
- Achieves Energy Efficiency similar to the original appliance
- Saving of refrigerant used per service by about 40% as flushing and purging processes are eliminated with the use of E&C equipment
- Save Ozone Layer & of course lesser GWP.



# IMPROVMENTS

- ✓ Fair approach to refrigerant selection is necessary with due concern for protecting the environment and economical means while thinking of retrofitting
  - Ozone Depletion
  - Global Warming
  - Energy Efficiency
  - Short atmospheric life
  - Low leakage rates
- ✓ For both environmental and economic benefit, focus on the highest possible energy efficiency and the lowest possible refrigerant emissions will be vital.
- ✓ Adopt Good Servicing Practices through training





# IMPROVEMENTS

- Integrate informal technicians in OEM training
- Online training material (but limitation that it has no practical component)
- Training video on good servicing practices (DVD widespread available nowadays)
- Pocket handbook with tips on installation and gas charging
- Updating the existing Vocational, NVQ & TE curricula
- Awards to technicians adopting good servicing practices



# IMPROVMENTS



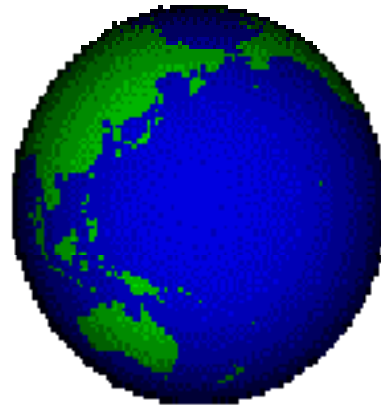
- More emphasis on hands on training

- More celebrations on Ozone Day i.e. Media Role





**THANKS**



**Let us SAVE our MOTHER EARTH**



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