

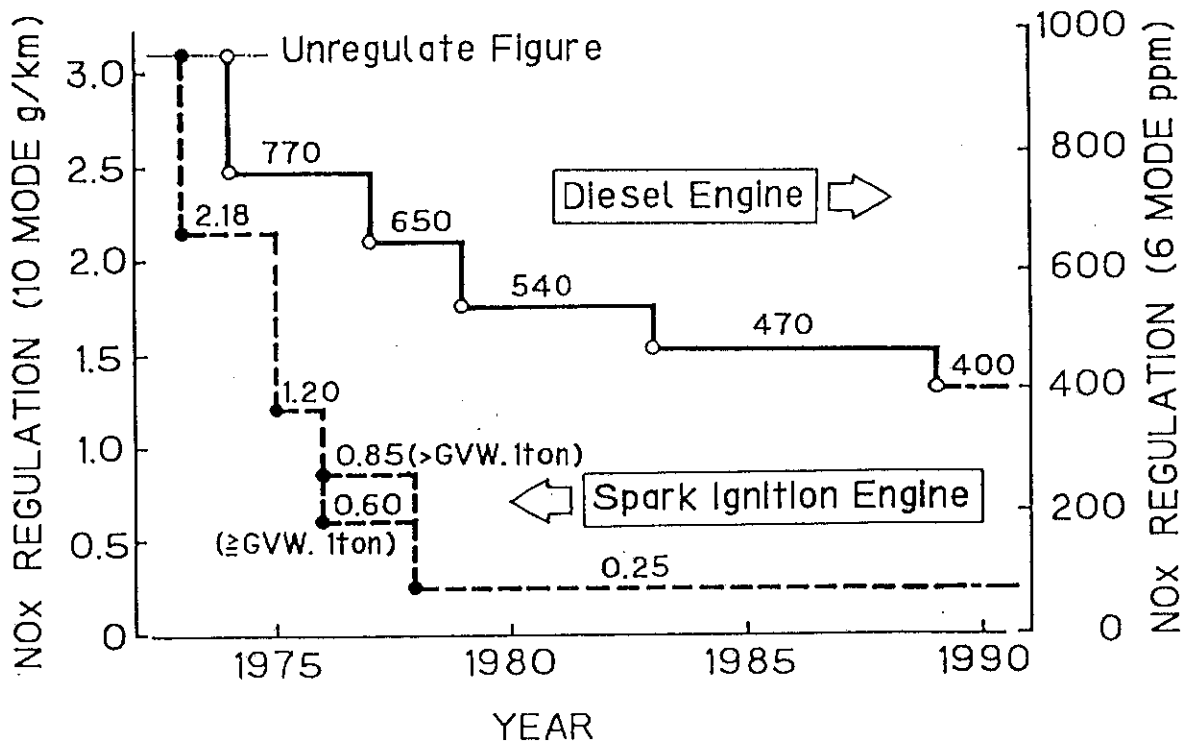
# **Emission Control Challenges in Future Diesel Technology**

**TAKASHI SUZUKI  
HINO MOTORS, LTD.**

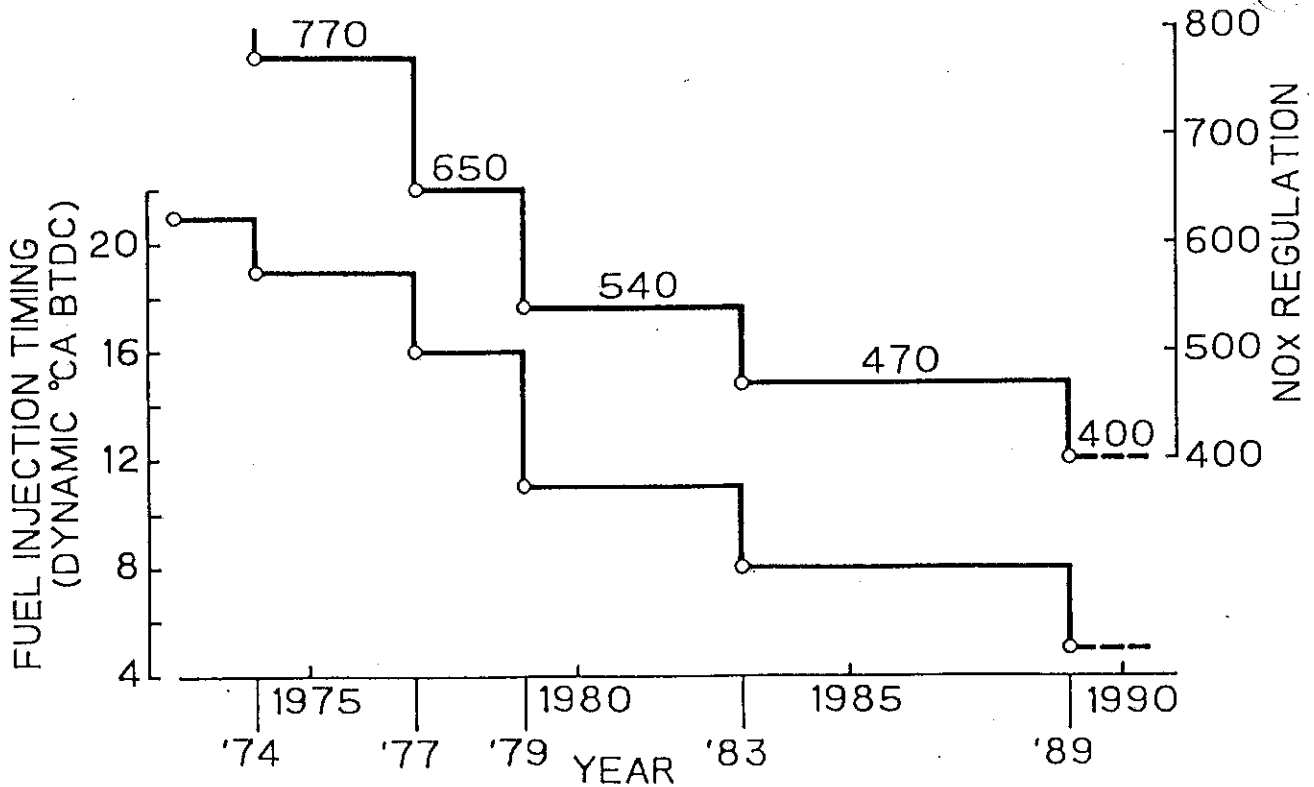
# Contents

1. History of exhaust gas emission control
2. Higher injection pressure and combustion
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4. Catalytic engine research
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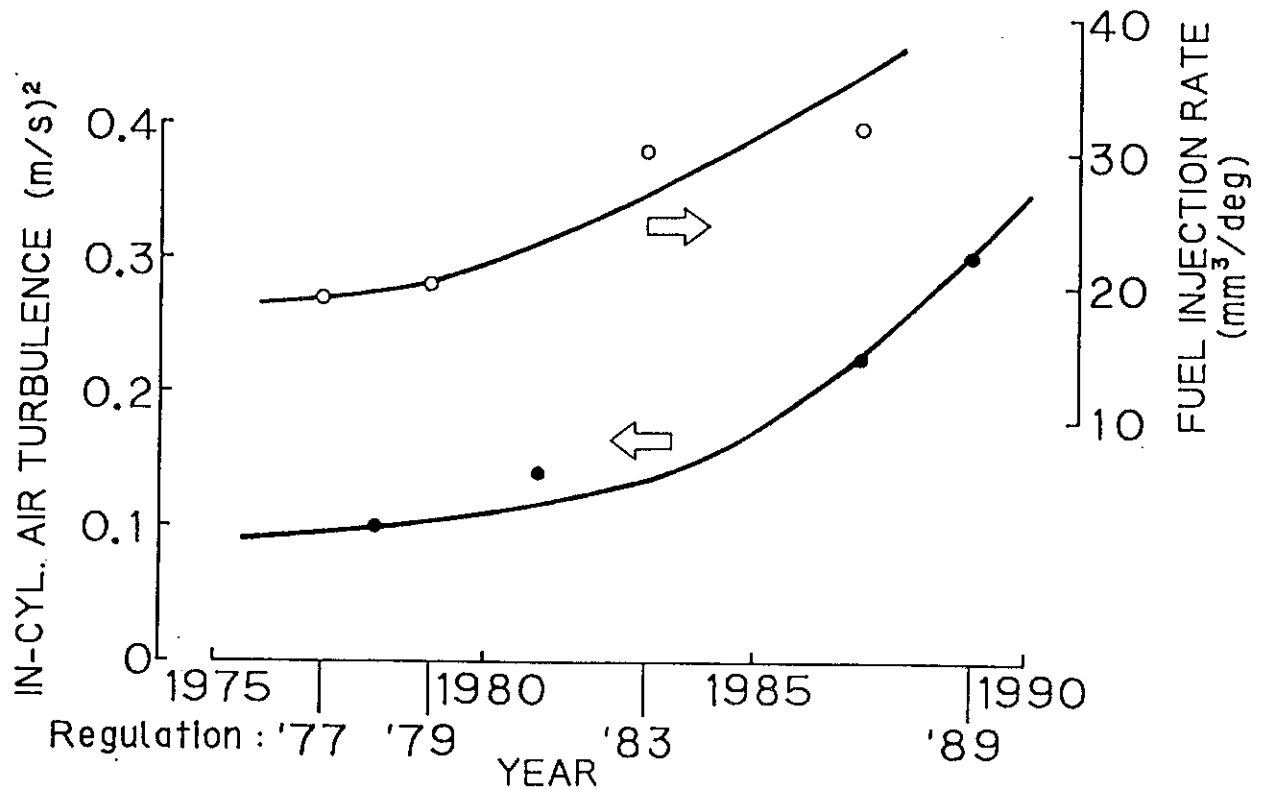
History of Exhaust Gas Emission Control



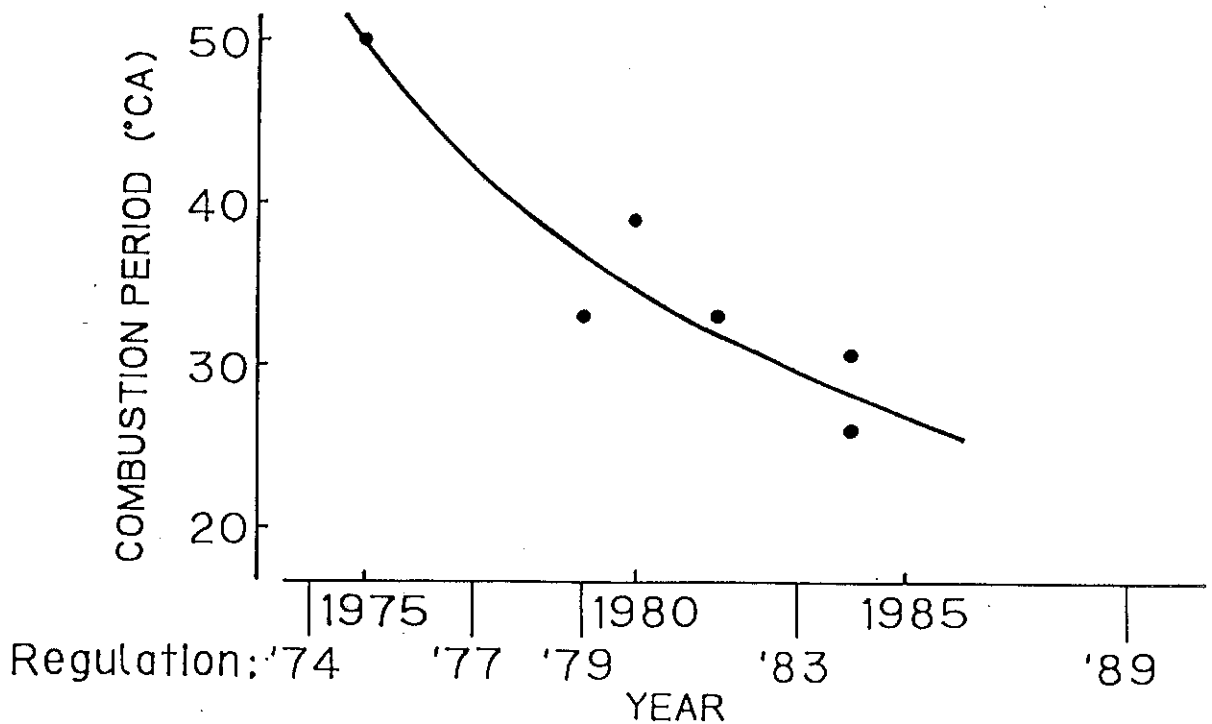
COMPARISON OF NOx REGULATION FOR BOTH DIESEL AND SPARK IGNITION ENGINE.



FUEL INJECTION TIMING RETARDATION DUE TO INTENSIFIED NOx REGULATION (EK100 ENGINE)

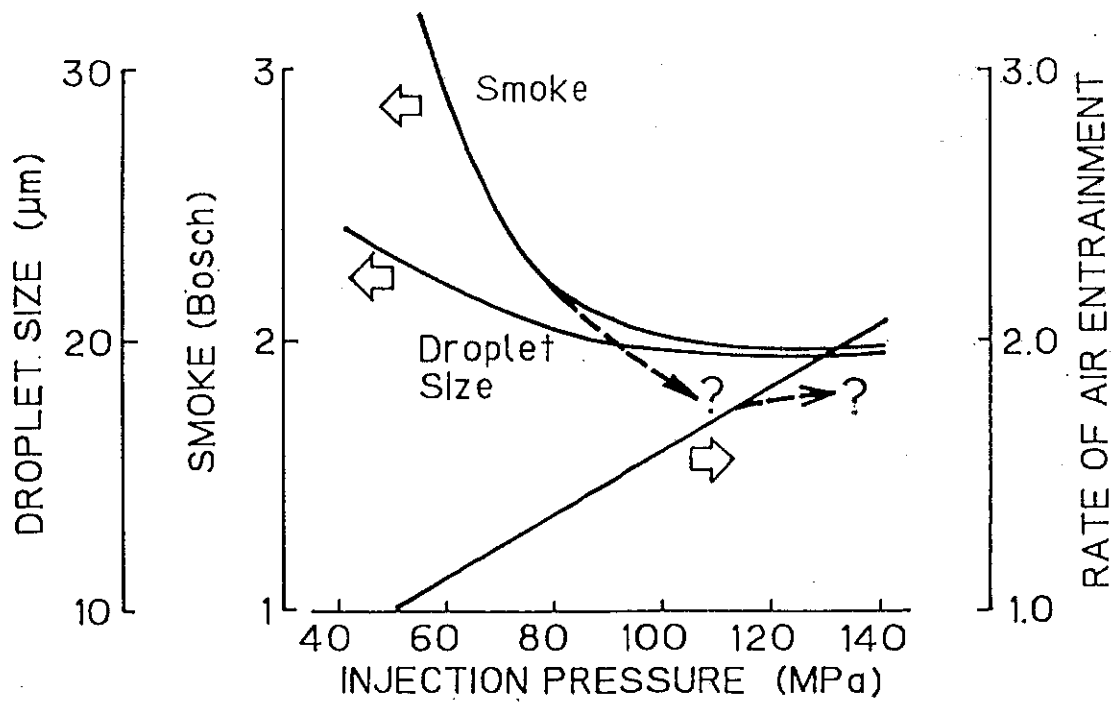


INCREASING OF IN-CYLINDER AIR TURBULENCE AND FUEL INJECTION RATE.

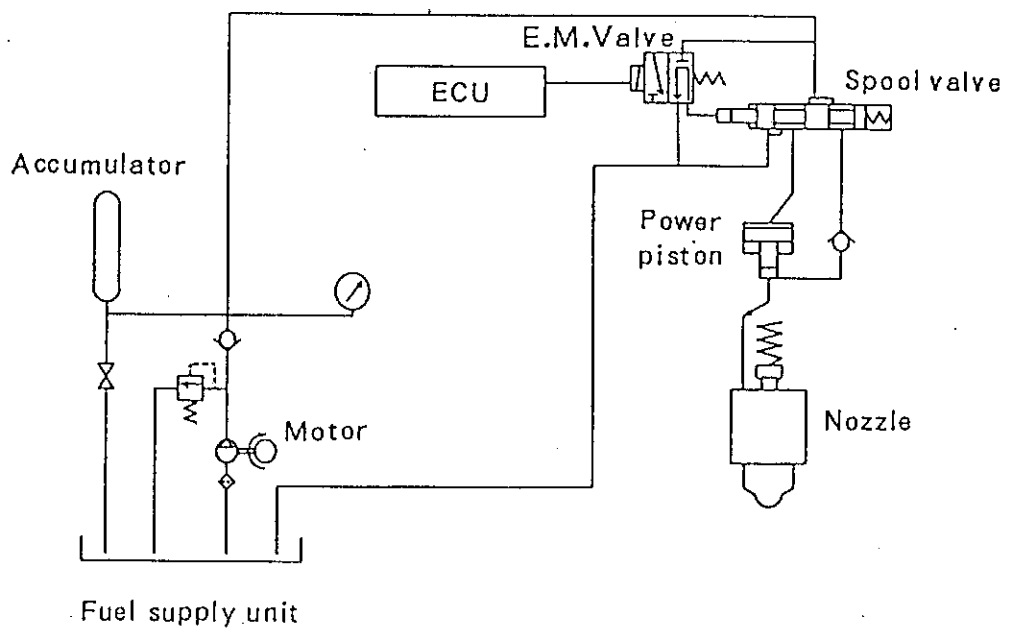
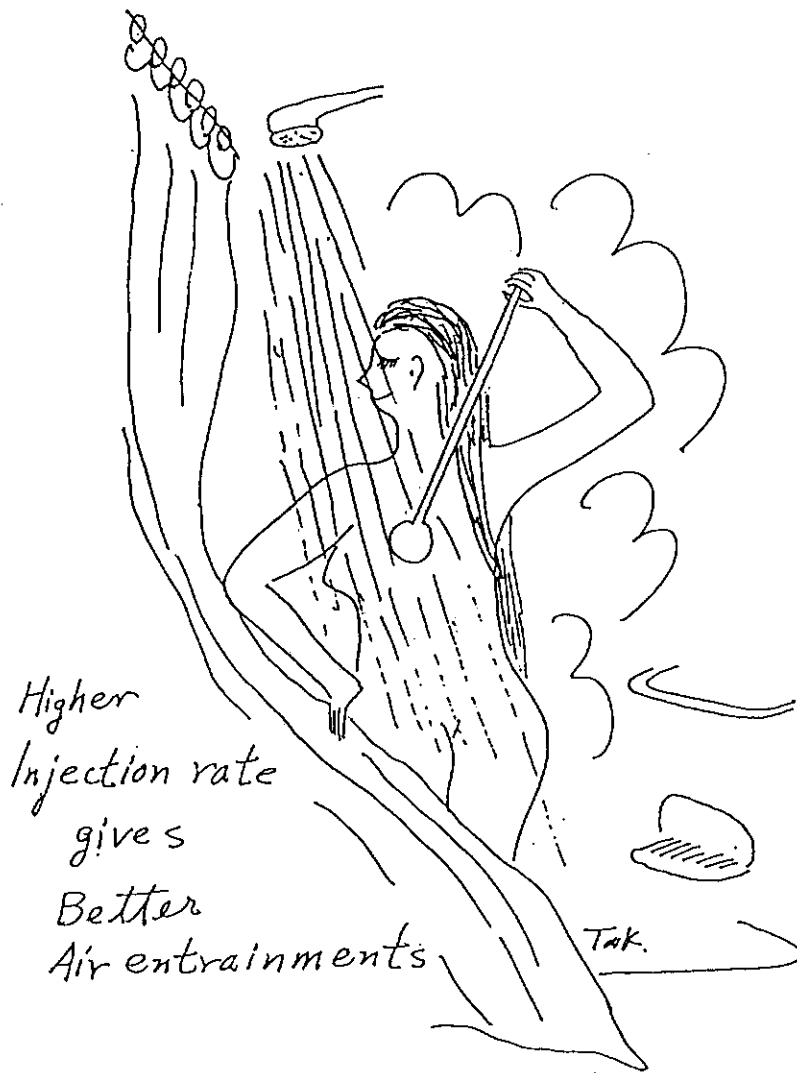


DECREASE OF COMBUSTION PERIOD ACCORDING TO INTENSIFIED NOx REGULATION

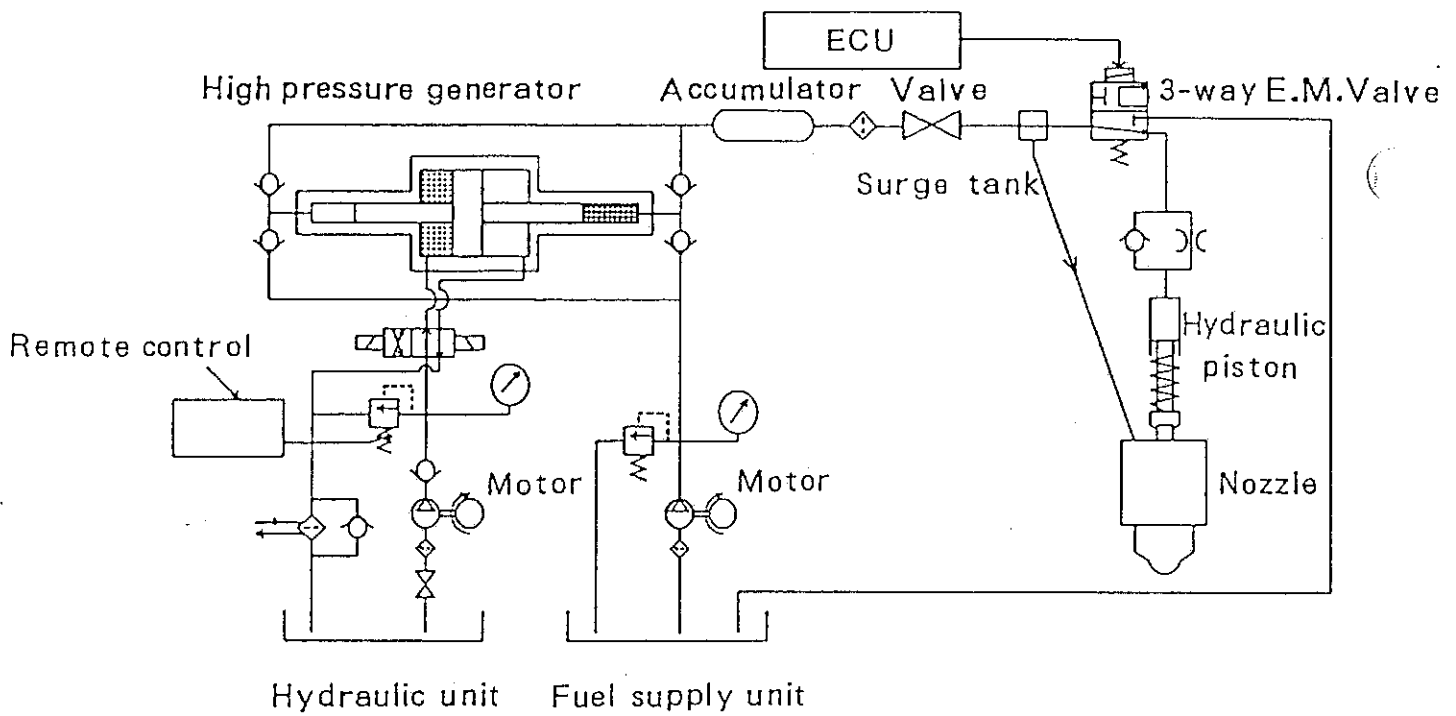
# Higher Injection Pressure and Combustion



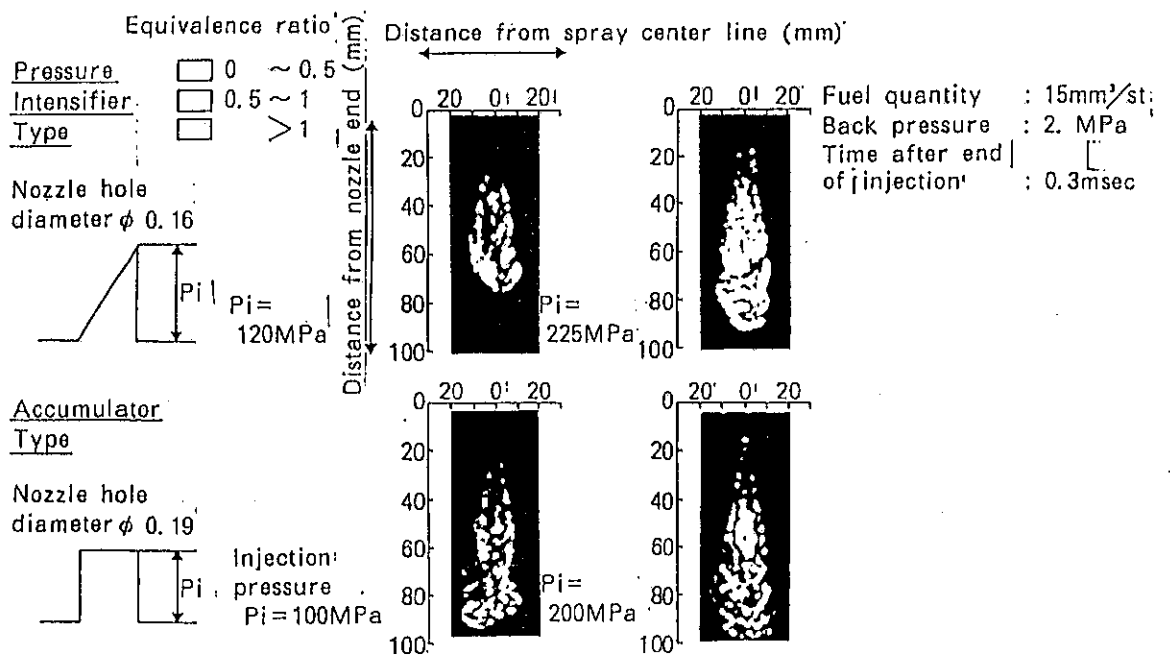
EFFECT OF INJECTION PRESSURE ON DROPLET SIZE, AIR ENTRAINMENT AND EXHAUST SMOKE.



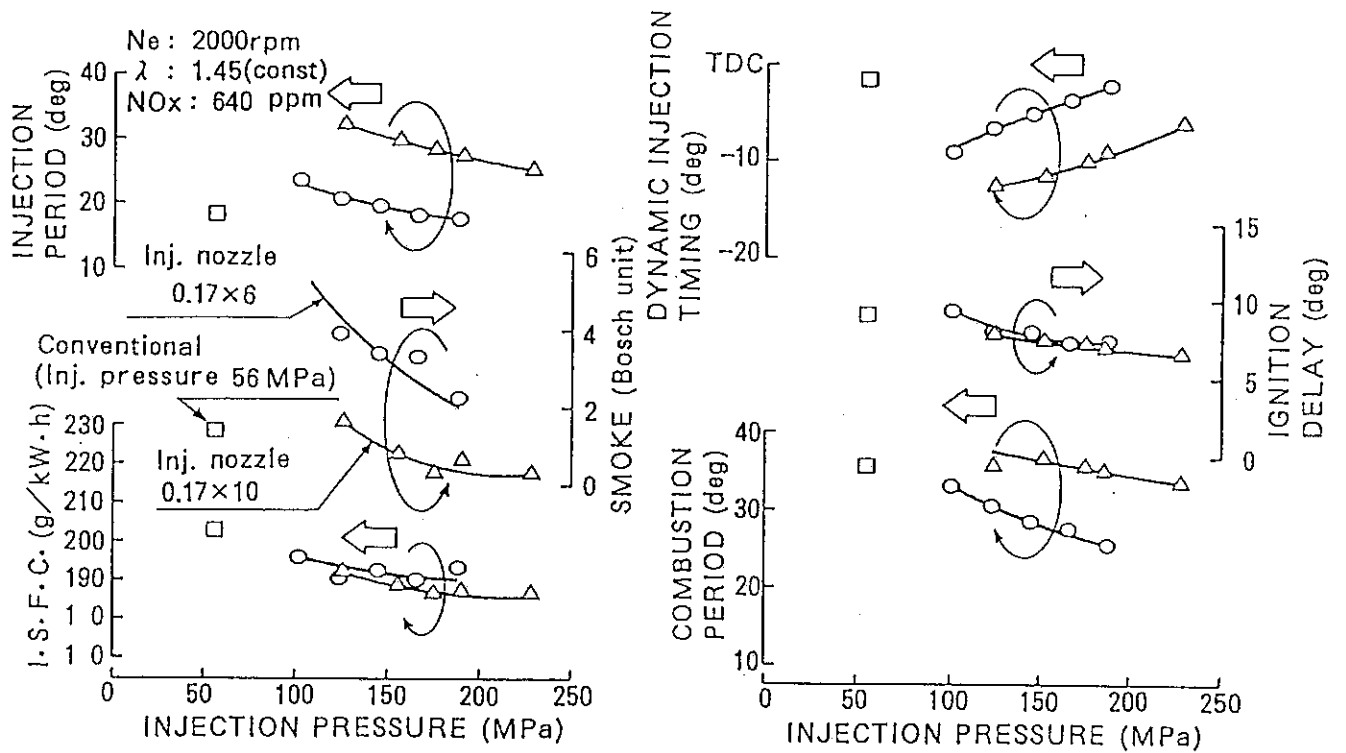
PRESSURE INTENSIFIER TYPE INJECTION SYSTEM



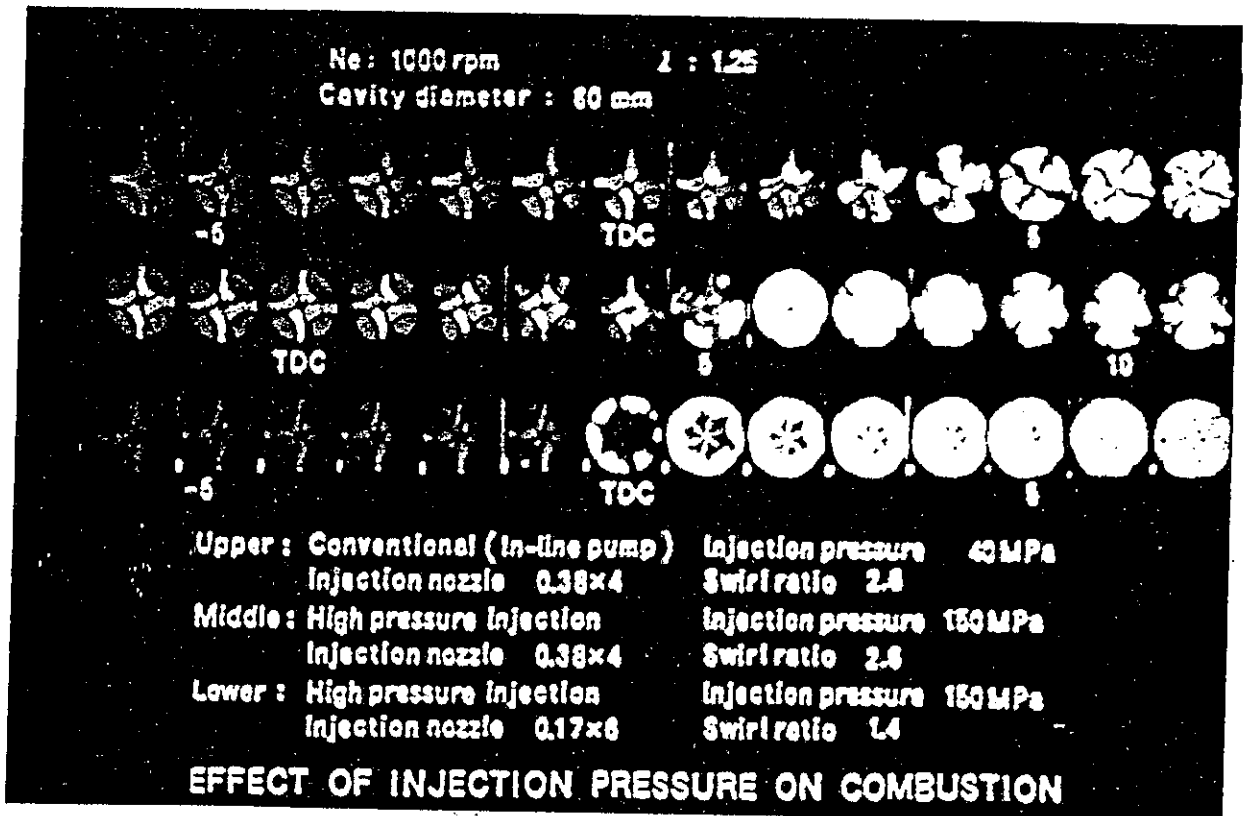
## ACCUMULATOR TYPE INJECTION SYSTEM



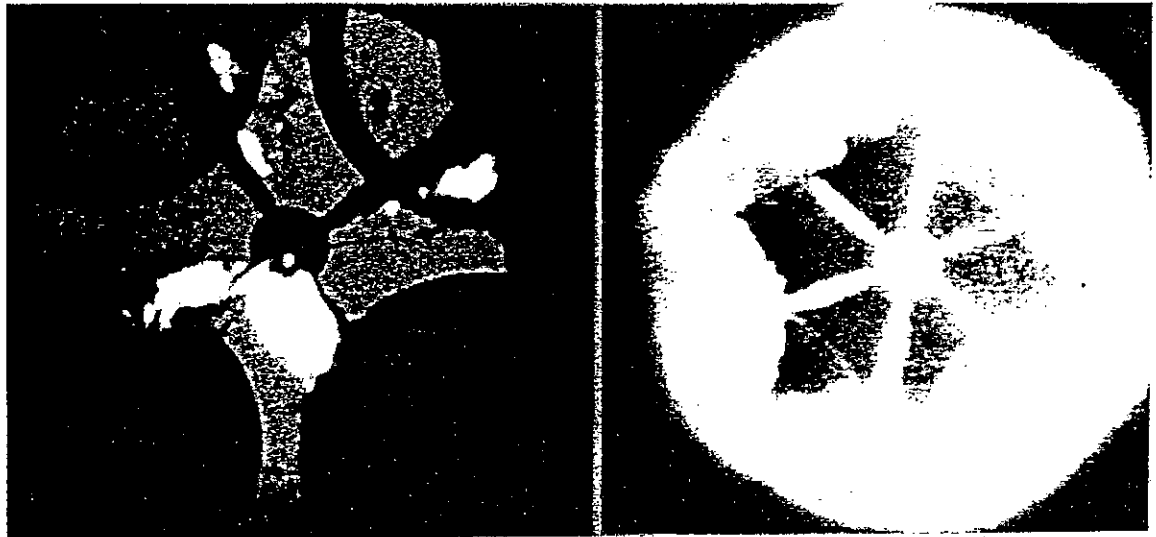
RELATION BETWEEN INJECTION PRESSURE AND LOCAL EQUIVALENCE RATIO



EFFECT OF INJECTION PRESSURE ON EXHAUST SMOKE AND COMBUSTION CHARACTERISTICS



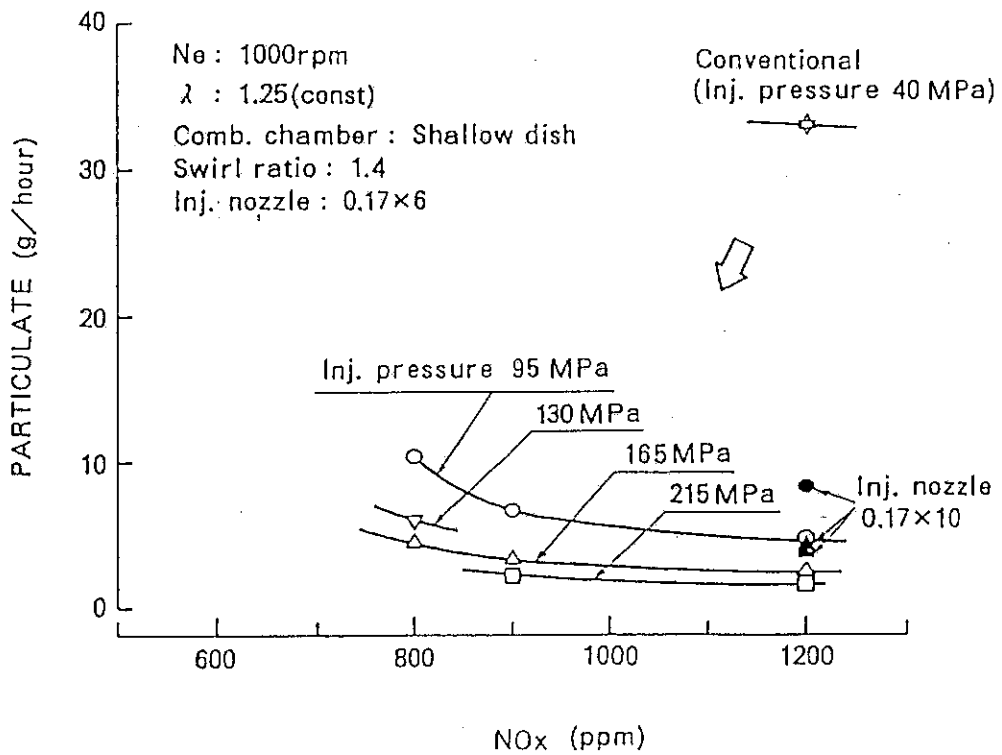




INJECTION PRESSURE 40 MPa

INJECTION PRESSURE 150 MPa

EFFECT OF INJECTION PRESSURE ON COMBUSTION FLAME

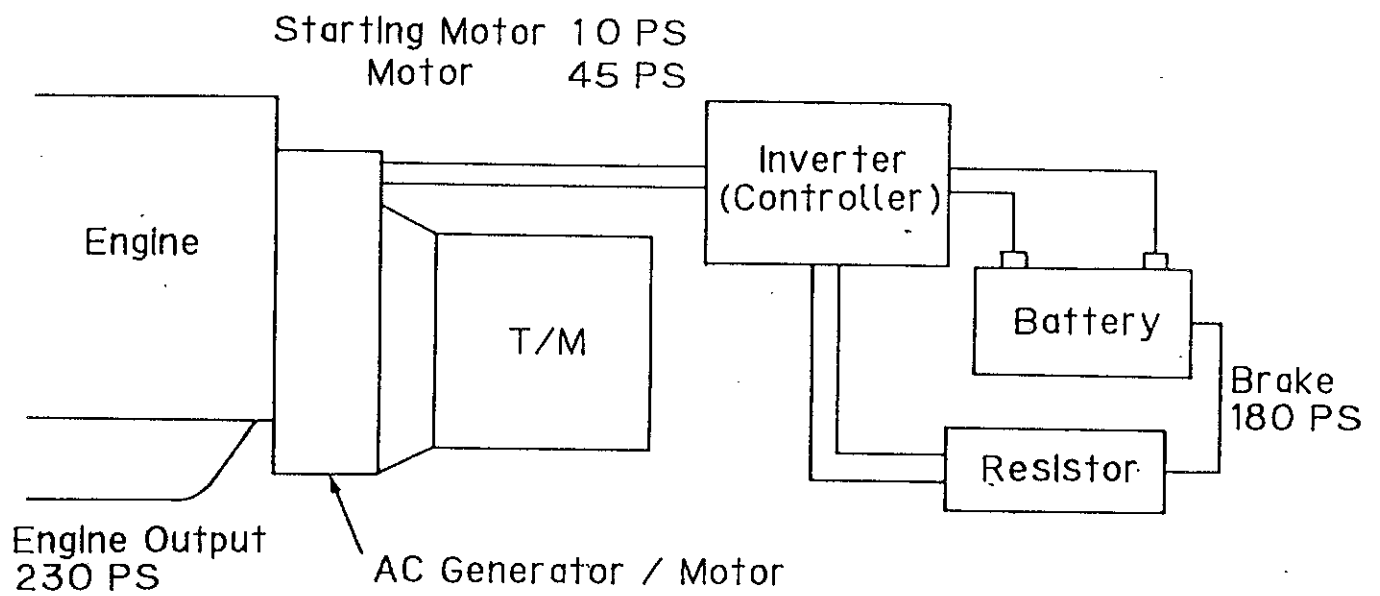


EFFECT OF INJECTION PRESSURE ON PARTICULATE AND NOx

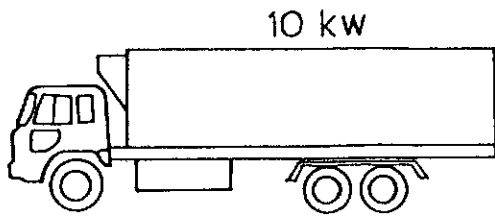
# Hybrid Approach by HINO

for

## Energy Saving and Low Emission

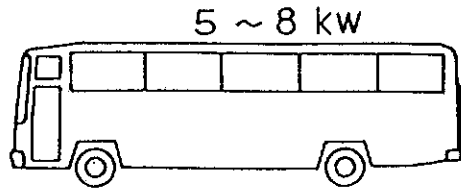


BASIC CONCEPT OF E.B.



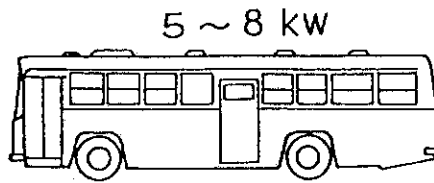
10 kw

Freezer Van



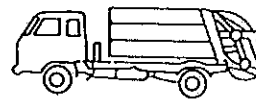
5 ~ 8 kw

Sight Seeing Coach



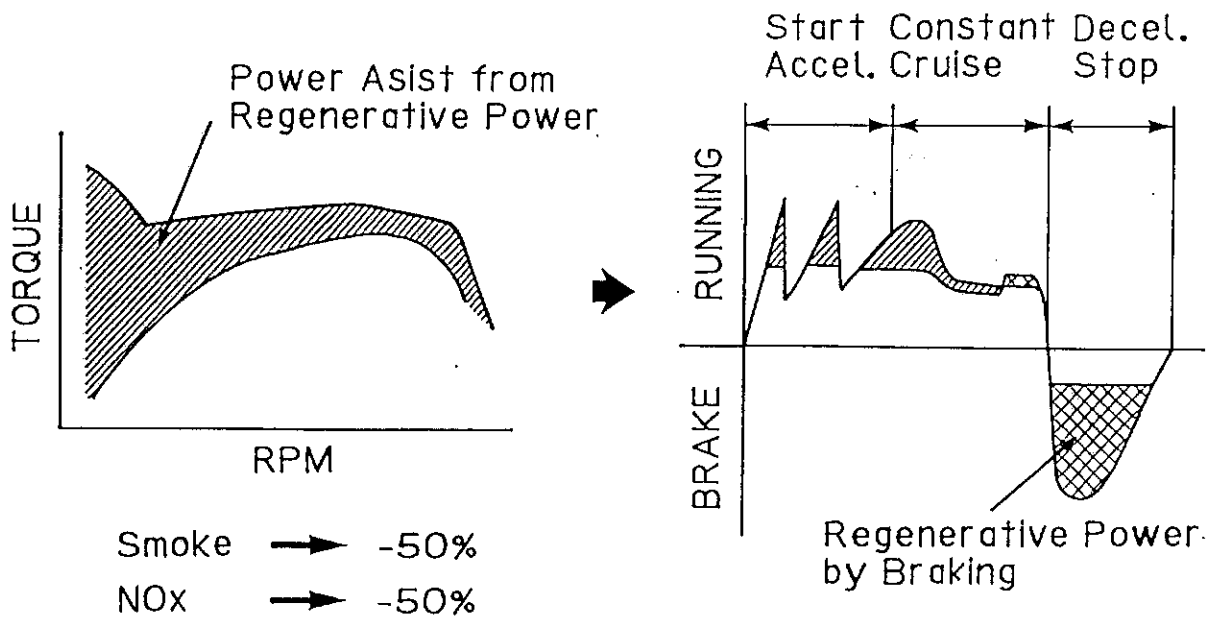
5 ~ 8 kw

Transit Bus



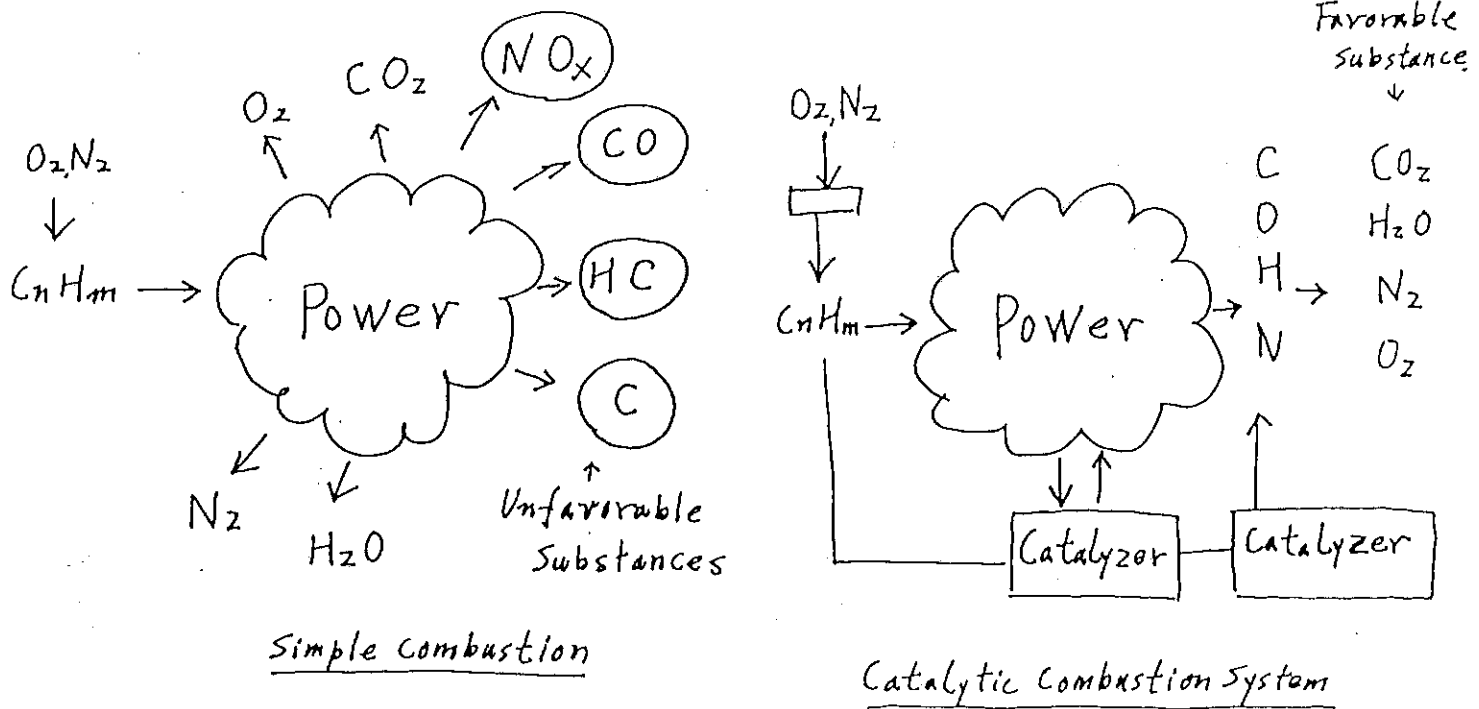
Packer

### APPLICATION OF E.B.

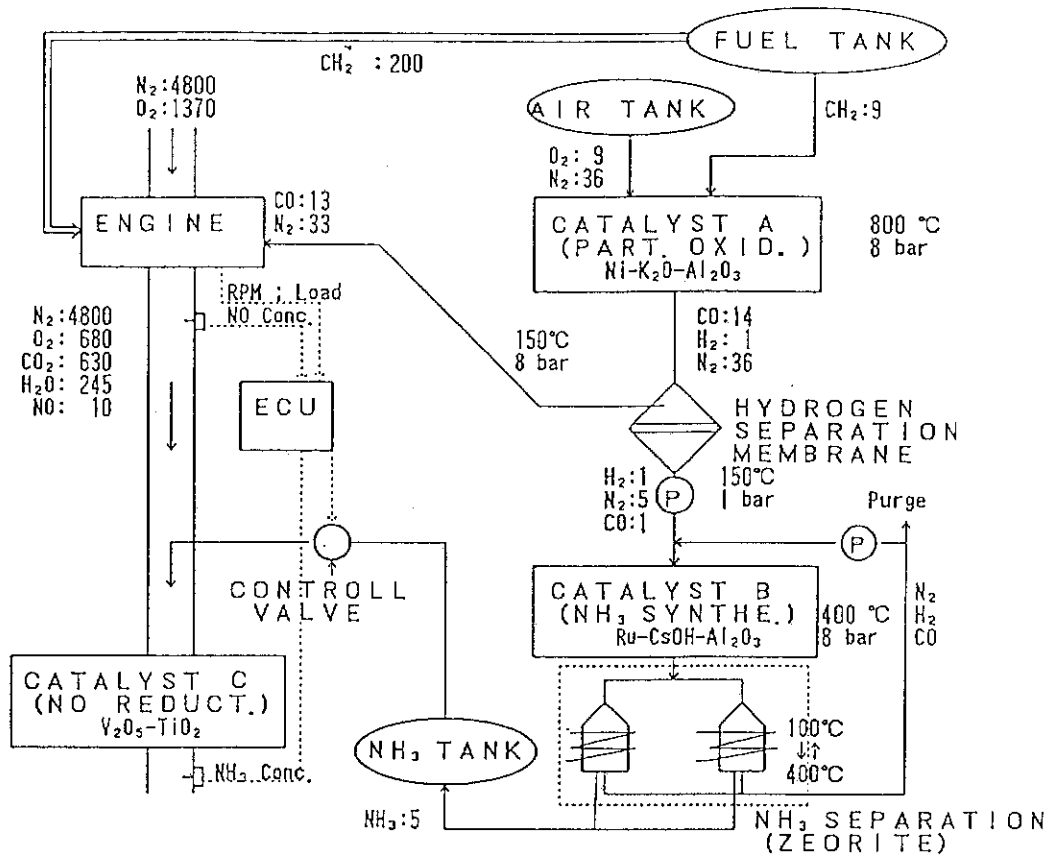


### EFFECTS ON EMISSION BY E.B. APPLICATION

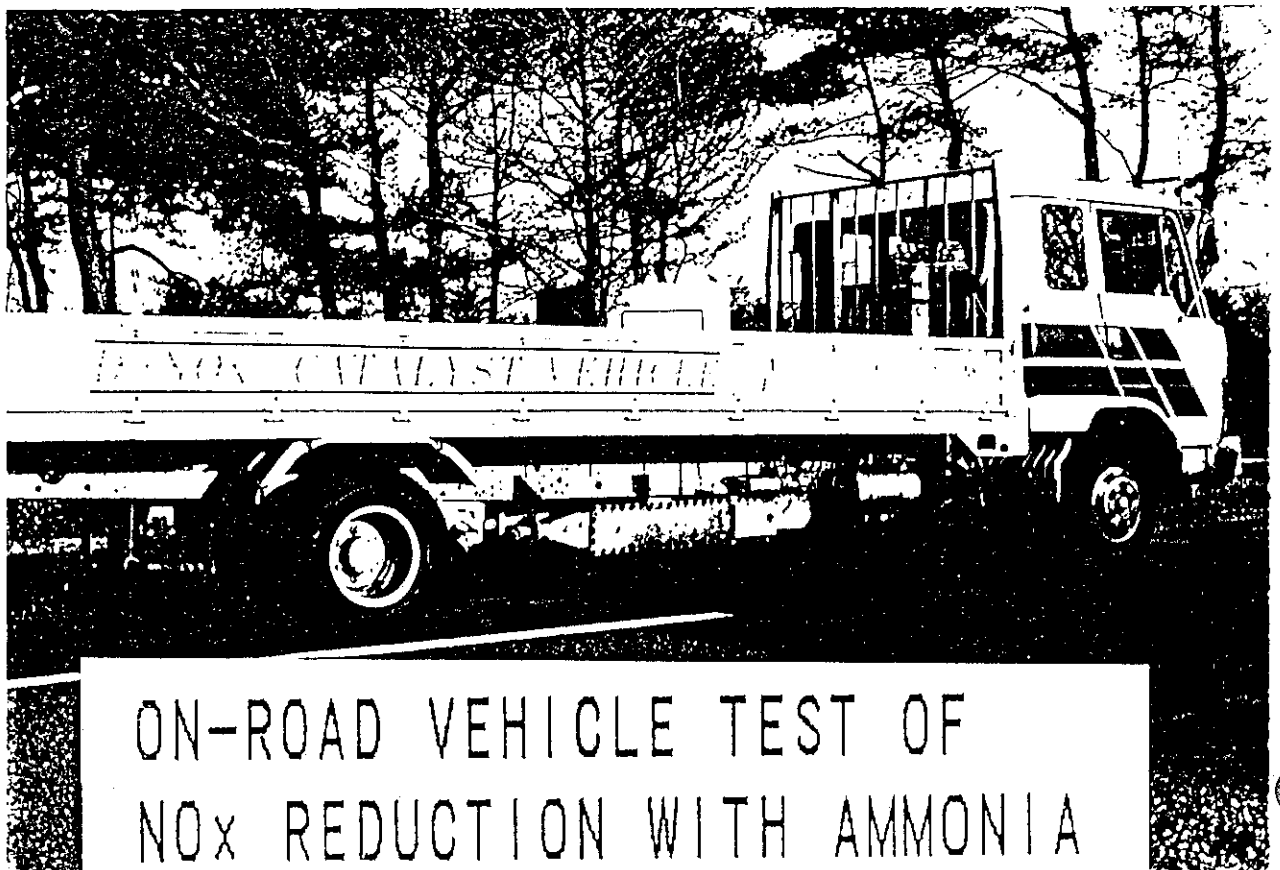
# Catalytic Engine Research

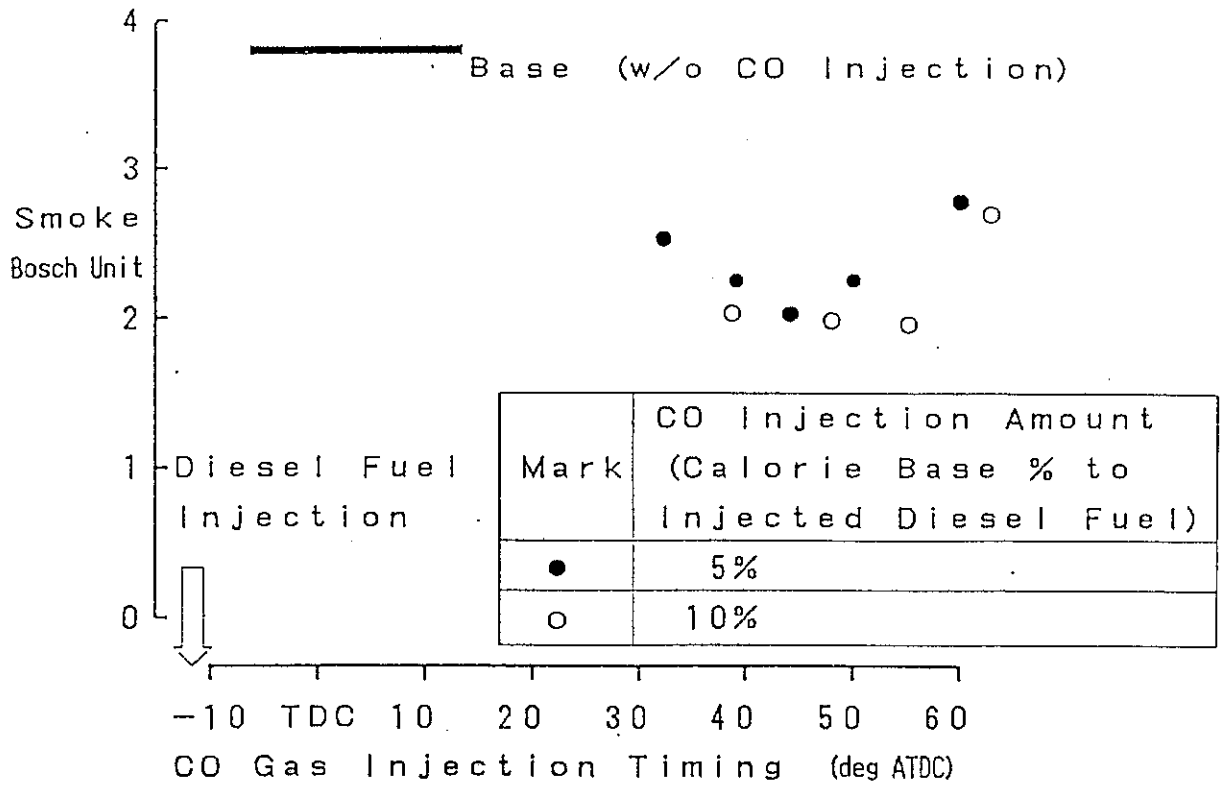


IMAGINARY FIGURE OF COMBUSTION OF "SIMPLE COMBUSTION" AND SOME "CATALYTIC COMBUSTION SYSTEM"



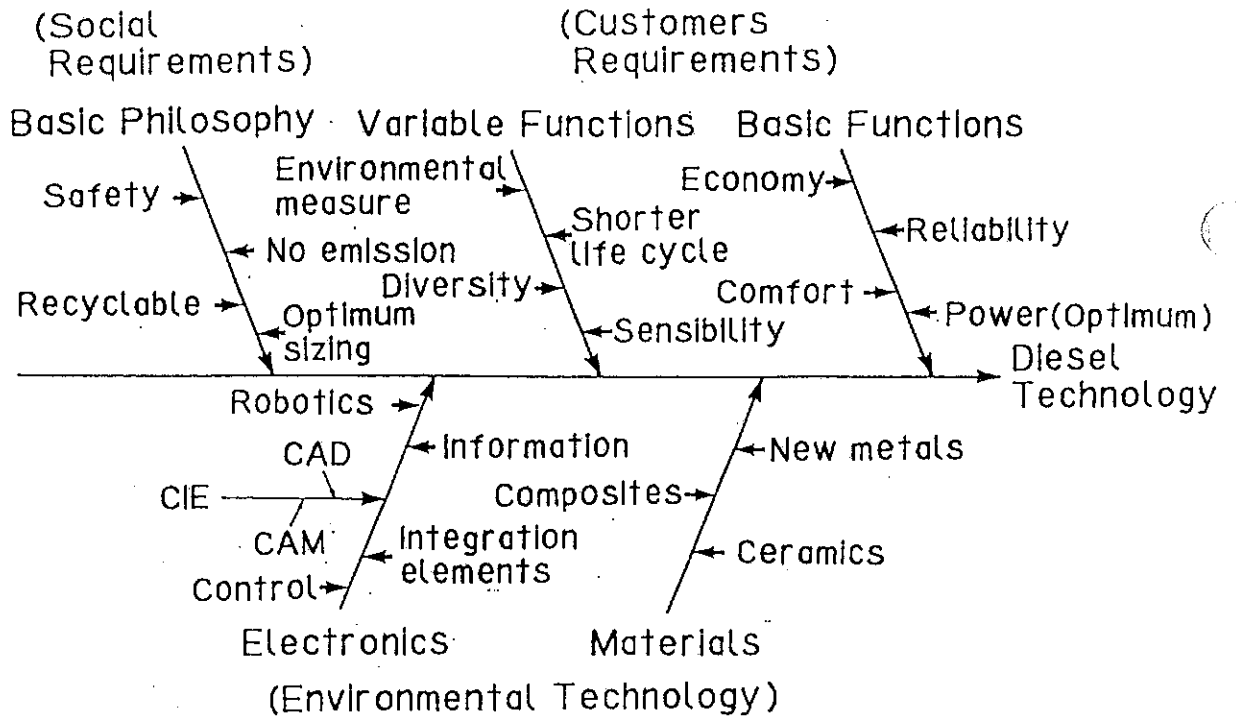
CATALYTIC ENGINE CONCEPT (Unit: g/psh)



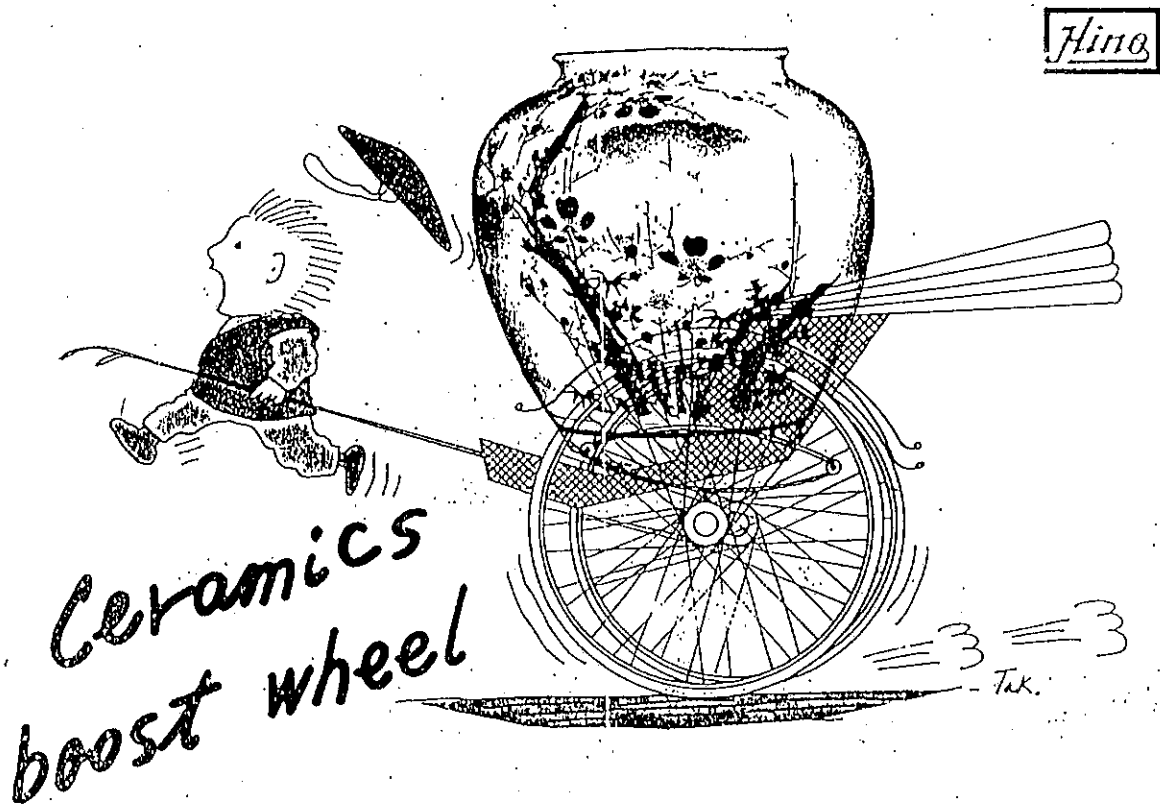


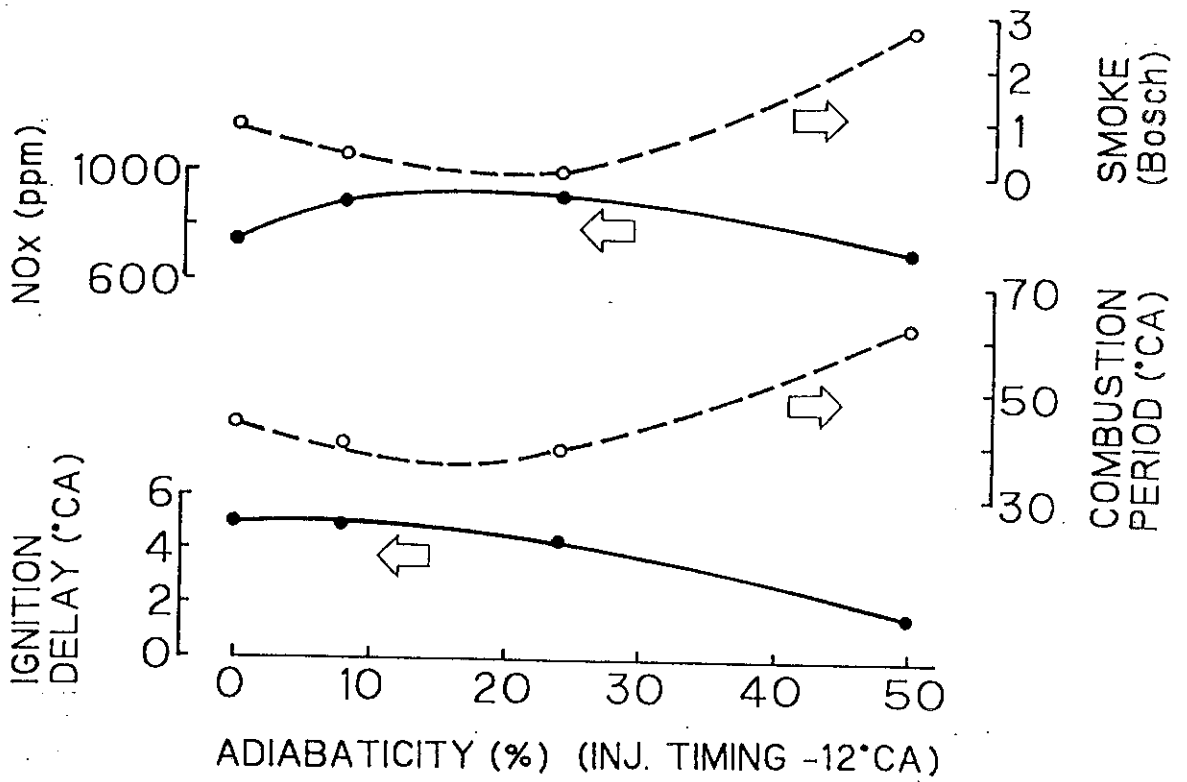
## REDUCTION OF BLACK SMOKE BY CO GAS INJECTION

Future Vision



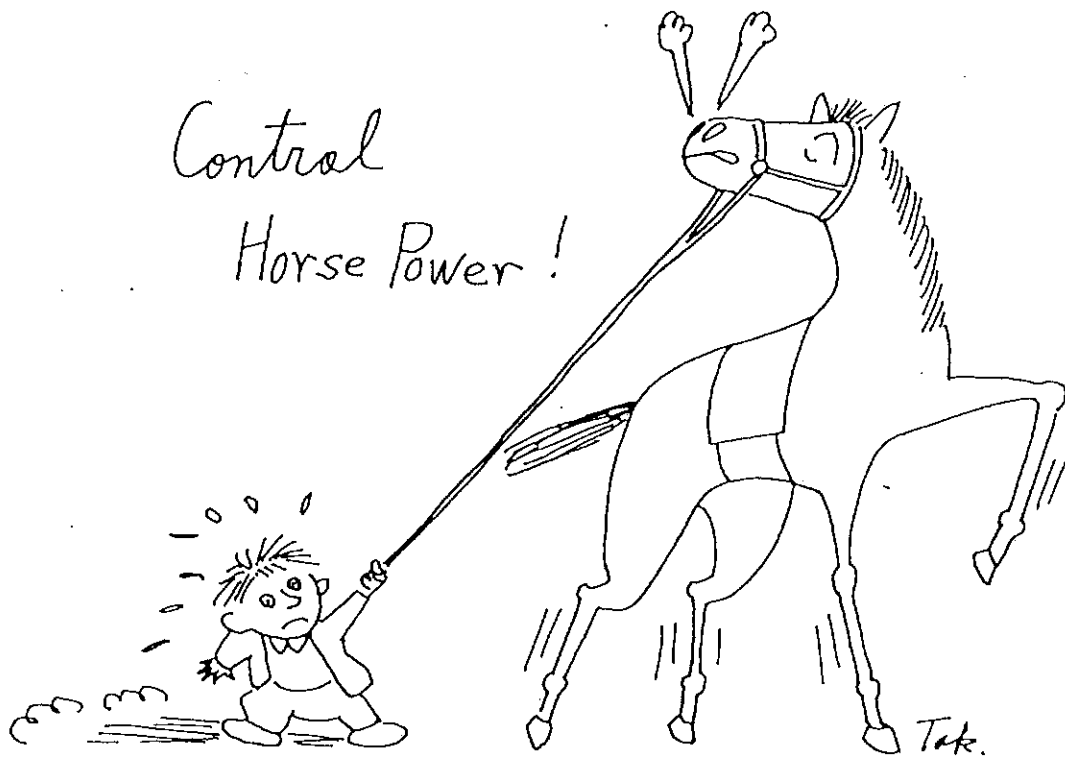
## DEVELOPMENT OF DIESEL TECHNOLOGY FOR FUTURE





## COMBUSTION CHARACTERISTICS OF HEAT INSULATED ENGINE

(Base HINO EP100 2300rpm Full Load)

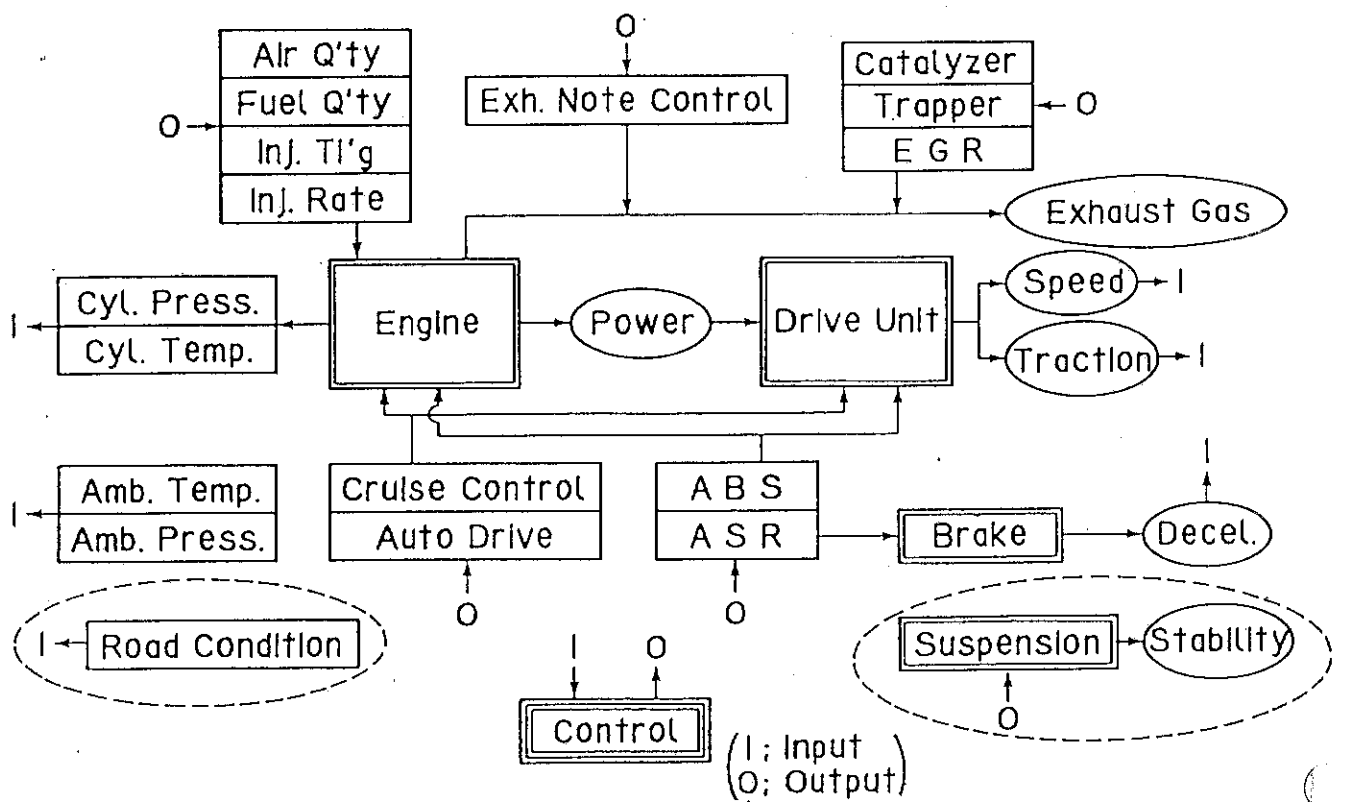


Origin of Diesel Engine Control

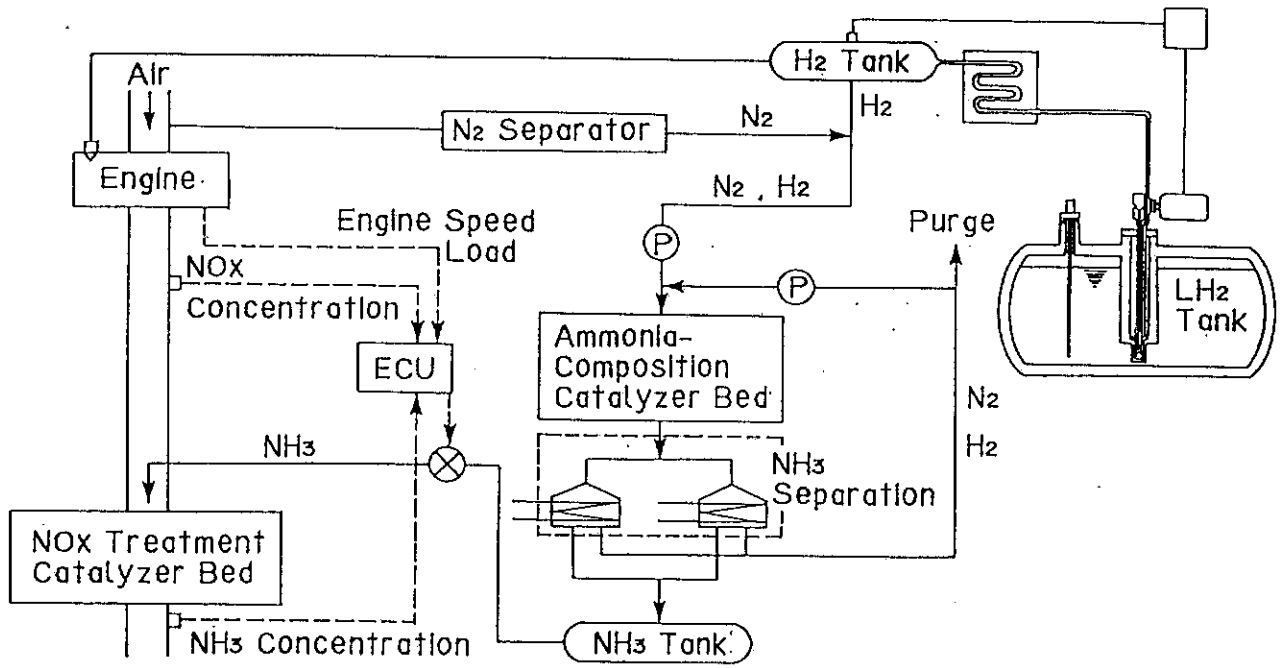




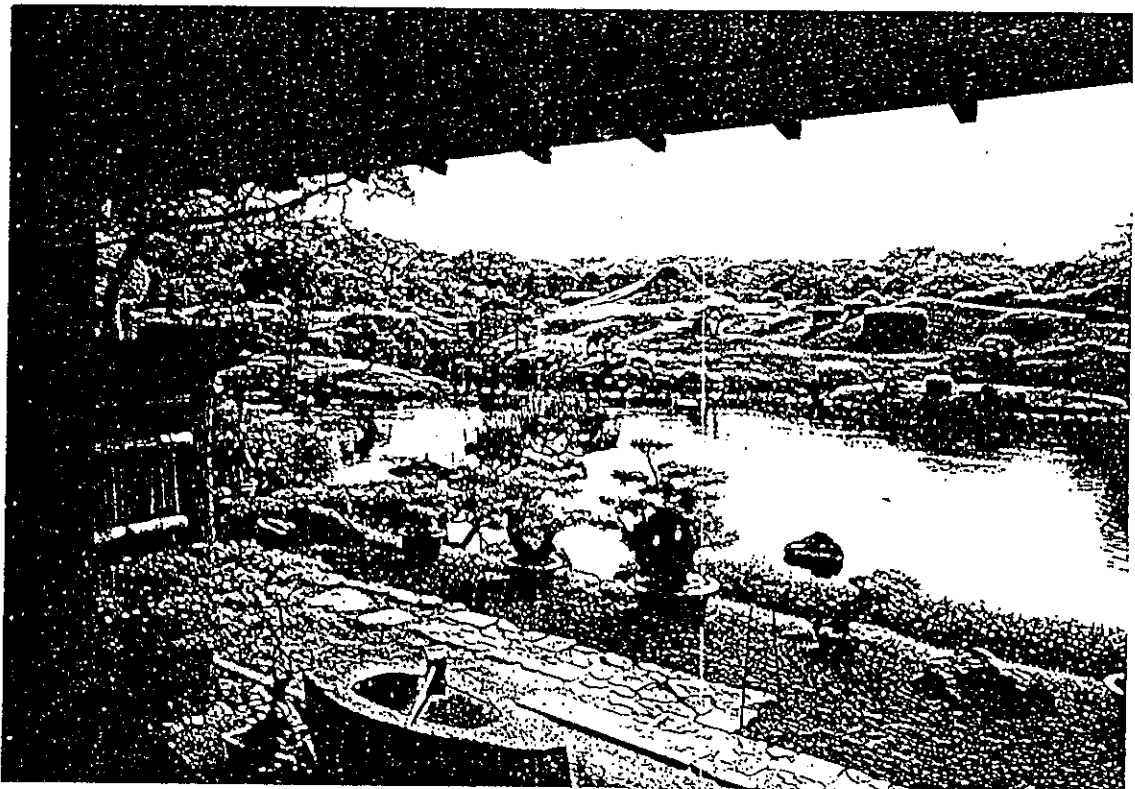
Total Control of Diesel Vehicle



TOTAL CONTROL OF DIESEL VEHICLE



CONCEPT OF CATALYTIC HYDROGEN FUELED ENGINE



Next stage of civilization  
should  
naturally belong within nature



## Conclusion

Future Engine  
should  
be

1. Minimizing entropy increase
2. Minimizing toxic emission, both to be masked in the natural existence level

through 1. Innovative technology  
2. Simultaneous activity